THE BUTTERFLY GENUS CALEPHELIS

FRONTISPIECE

WILBUR S. McALPINE

A REVISION OF THE BUTTERFLY GENUS CALEPHELIS (RIODINIDAE)

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THE LEPIDOPTERA RESEARCH FOUNDATION, INC.
The Journal of Research on the Lepidoptera
1160 W. ORANGE GROVE AVENUE
ARCADIA, CALIFORNIA, USA 91006

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FOREWORD

This work on the genus *CALEPHELIS* is the result of nearly a lifetime of effort. Many of us were not yet born when Wilbur S. McAlpine collected that specimen shown in the color plate dated Aug. 1, 1915 (fig. 6). Mr. McAlpine is an amateur lepidopterist; by that is meant that his primary livlihood was in a field other than the study of Lepidoptera. Few indeed can truly claim to be "professionals". In the Lepidoptera, as in the study of most insect groups, it is the amateur 'professional' to whom we owe most of our knowledge. The key to this success is due not to monetary pursuits, but rather the pursuit of an intangible desire to make known what is unknown and to present these facts in as accurate and scientific a manner possible. We all realize that any one of our efforts is incomplete, and that some of our conclusions may be changed in the future, but we can be assured that there is here in this publication the greatest effort to present a job well done as a foundation upon which further steps upward may be made in the future.

The appearance of Calephelis is not that of an impressive butterfly, of bright colors. On the contrary, *Calephelis* is a very demure butterfly, the species of which may not differ by many (or any) visible wing characters. In this work, therefore, the more hidden structural details have been used as an aid in their distinction.

I first met Wilbur S. McAlpine in Michigan in 1945. He became one of the first subscribers to this Journal when it began publication in 1962 and he has been a contributing member of the Lepidoptera Research Foundation, Inc. from its organization to the present day. His devotion to the advancement of knowledge of the Lepidoptera speaks for itself.

W. Hovanitz

THE AUTHOR

WILBUR S. McALPINE

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BORN: Detroit, Michigan, Dec. 30, 1888.

EDUCATION: Graduate of Detroit Central High School, Jan. 1908.

SERVICE: 472nd Engineers, First World War 1918.

FAMILY: Wife and son.

POSITIONS: U.S. Lake Survey 1908, 1909, M.C.R.R. draftsman 1910, 1912, Detroit Edison Co. draftsman 1914, Assistant Surveyor in Survey of Coal Claims at Homer, Alaska 1906, 1907, 1911, Principal and owner of a Mapping, Surveying and Engineering business at Birmingham, Mich. under name of McAlpine Engineers Inc. and W. S. McAlpine Map Co. from Dec. 1915 to Jan. 1, 1965 when I retired and sold the business to my employees who are at present conducting the business under the same names.

During my ownership of the business complete maps of all counties of Michigan were made showing sections, also a property ownership Atlas of Oakland County, Mich., and detailed sectional maps of several townships in Oakland Co. Surveys made during this period included over two hundred Subdivision Plats, engineered and recorded, also numerous farm, topographic and lot surveys.

In 1914, 1915 and 1916 I made collecting trips for Lepidoptera to various localities in Michigan for the University of Michigan Museum and have done considerable collecting of Lepidoptera for myself in Michigan ever since about 1905 when I first became interested, and have a private collection of at least 10,000 insect specimens, mostly Lepidoptera, from Michigan.

INTERESTS: Collection and study of Michigan Lepidoptera, life history work in particular. Have been much interested in *Hyalophora columbia* in Michigan, and have reared it, and its hybrid with *H. cecropia.*

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Evangelistic singing, as soloist.

Papers: Publication of life histories of two Michigan butterflies and naming of two new species of Calephelis over thirty years ago.

Honors: Life Member of Oakland Co. Engineering Society 1969, Life Member Michigan Society of Registered Land Surveyors 1970, Honorary Member of Michigan Entomological Society, 1970.

Journal of Research on the Lepidoptera 10(1):1-125, 1971

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WILBUR S. McALPINE

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INTRODUCTION

I FIRST BECAME PARTICULARLY INTERESTED in the genus Calephelis when I discovered that the little metal mark we were finding in Michigan was not *Calephelis borealis* but a new species which I described in 1937 as *Calephelis muticum.* This was brought about through working out its life history and comparing same with the life history of true *Calephelis borealis* which Cyril F. dos Passos was making at that time. Determinations were made at the U. S. National Museum, and I found then that much confusion existed regarding identity of species in that genus. A little later my friend Dr. George W. Rawson, who had collected Lepidoptera extensively in Michigan, sent me a few specimens of a Calephelis that he had collected at San Antonio, Texas in 1919. These specimens also proved to be a new species, so I described it in 1939 as *Calephelis rawsoni.* I then decided to obtain as much Calephelis material together from all sources, that is museums in this country and Europe and private collectors and make a Revision of this genus. At first I expected to only make a Revision of species in United States and Mexico but considerable material kept coming in from Central America and South America so I decided to make a complete Revision of genus Calephelis as it occurs throughout the Americas. Besides making several trips to Texas, Arizona, California and Florida in search of specimens, I have also made a couple of trips to Mexico for specimens and a couple of trips to Europe, examining specimens in the British Museum and Paris Museum.

The authors of the generic name Calephelis were Grote and Robinson, published in Trans. of American Entomological Society, Vol. 2, Page 310, in 1869, with type *Erycina virginiensis*

Guerin-Meneville 1831 and was based principally upon their genus having naked eyes, and not hirsute ones as in some tropical species of genus Charis. This generic name was recognized by all until 1922 when Barnes and Lindsey proposed the name Lephelisca to take the place of Calephelis because of an error made by Grote and Robinson in miss-identifying *C. virginiensis* their type specimen before them, as *Charis caenius,* a name it was listed under in lists at that time. Most lepidopterists including McDunnough in his check list of 1938 ignored the generic name Lephelisca but it was revived again in 1947. This whole matter was clarified however, by a unanimous decision of the International Commission on Zoological Nomenclature made in Feb. 1967 in which the name Calephelis was validated with type *virginiensis* Guerin-Menville 1831, and Lephelisca and other generic names in use were placed in the official Index of Rejected and Invalid Generic names. Dr. Cyril F. dos Passos, who made the application to the Commission to validate the name Calephelis, and the author of this paper, were largely instrumental in bringing this about.

The name Calephelis is derived from Greek words meaning "the beautiful deceiver" and from my experience and that of others trying to make identifications in this genus, it is certainly most appropriate. Only a dozen species of Calephelis have been described to date of this publication, and a couple of these have proved to be synonymous or unrecognizable.

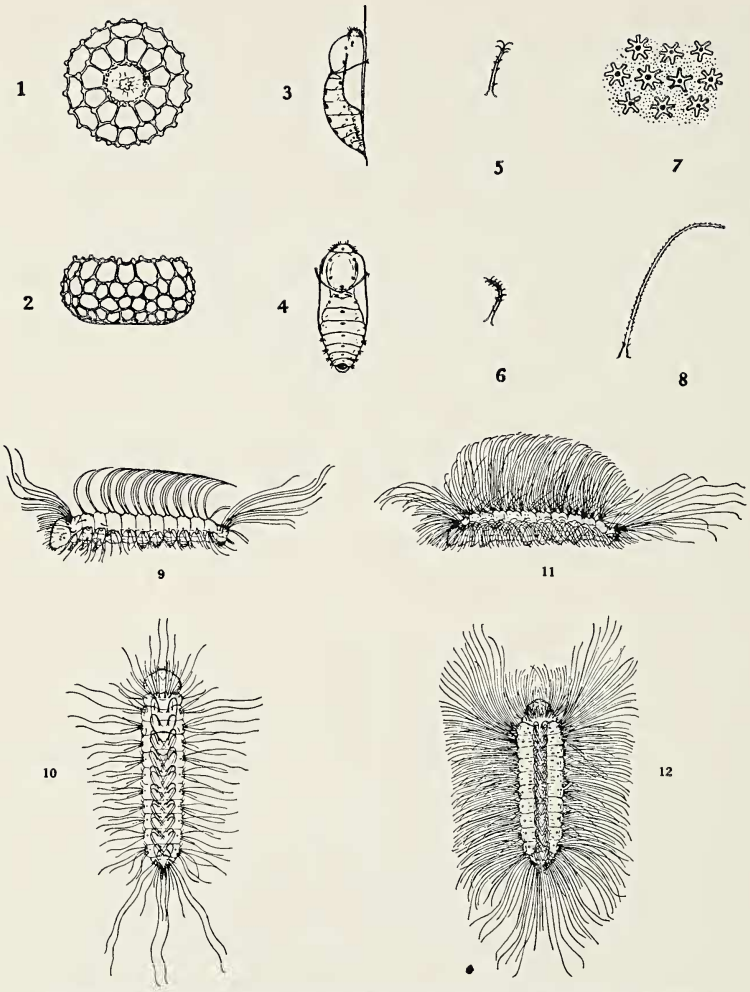
Calephelis is a genus of small butterflies, which have a wing expanse of about one inch. The upper wing surface is rather plainly colored with shades of brown, the basal half being darkened by a small black rather indistinct irregular linear markings which form broken concentric lines with the base. There are two marginal lines of rather faint metallic markings, usually silvery, which extend along outer margin of both wings between which is a row of small black dots. The lower wing surface is of a light ochre color, with markings of the upper wing surface repeated, only much more discernible and attractive, especially the metallic, silvery ones. They are weak flyers and often alight with their wings spread out on the under side of a leaf. In the warmer climates where most of the species occur, there are seasonal forms, and usually several broods, which adds to the difficulty of identification. Little is known regarding their life histories but from the few that are known, their food plant usually occurs in restricted areas near streams or in swamps, so the butterfly is not commonly seen, and is among the rarer

butterflies in the usual collection. Only the complete life histories of *borealis, muticum* and *nemesis, sub-species californica,* have been described agreeing in all three species as follows: egg turban shaped, caterpillar has long white hairs extending out laterally and up mid-dorsally; the chrysalis is suspended by a girdle of silk at the middle, and is covered with the molted exuviae and hairs of the last larval molt having the appearance of a loose woven cocoon. All the species look very much alike and are difficult to identfy with certainty, except through genitalie examination. The genitalia of both male and female usually have fairly good characters but some run close together in the complex species, especially in the males. The general pattern of Calephelis genitalia is distinctive from other Riodinid genera. In my drawings of genitalia in this Revision every effort has been made to make detailed accurate drawings, which speak for themselves much better than lengthy descriptions.

The range of the genus is approximately from the southern border of Canada, through Central America and through Argentine in South America with center of distribution appearing to be about Guatemala in Central America. Most of the species of this genus occur in the tropical areas below the United States border.

When one considers the size of a butterfly he usually thinks of its wing expanse, in inches or fractions, but in late years many authors, in order to be more exact, express size in millimeters, and by length of the forewing. In the genus Calephelis all the species are small, and of about the same size, being about three quarters of an inch (or nineteen millimeters), to an inch (or twenty-five millimeters) in wing expanse, and exact size is not very important. Even within the species there is some variation in size, due to food supply in their caterpillar stages. In my descriptions I have expressed size in millimeters for wing expanse, it being the measurement betweent the tips of the primary wings, the butterfly being mounted with posterior edge of primary wings at right angles with the abdomen which is the usual way for mounting in museum collections, and have also indicated the length of the forewing in millimeters.

In my illustrations in the Revision, the upper and lower surfaces of the butterfly are shown by photograph, but as all the butterflies in this genus look very much alike, they cannot usually be identified by superficial examination. The most positive means of identification of the various species is through examination of their genitalia, both male and female, where constant structural



1 and **2.** Egg, size horizontal 0.6mm.; **3** and **4.** Chrysalis length 9mm.; **5.** Substigmantal bristle on chrysalis greatly enlarged; **6.** Head bristle on chrysalis greatly enlarged; **7.** Sprocket shaped processes greatly enlarged; **8.** Typical long dorsal hair greatly enlarged; **9** and **10.** Larva First Instar length 1.3mm.; **11.** Larva Sixth Instar length 5.8mm.; **12.** Larva Fourth Instar length 3.4mm.

Drawings by W. S. McAlpine

Early stages of *Calephelis muticum* McA.

Figure 1.

Reprinted from: *Bull. Brooklyn Ent. Soc.* 33:111-121. 1938.

differences usually occur. There may be some variation in genitalia of some of the species or sub-species described, but the male genitalia is more constant while the female genitalia appears to be quite variable in a few of the species. Life history work is necessary to more fully determine this. Drawings were also made of some of the parts of the genitalia that were not so important for identification, but may be of some value. Drawings of the wings of most of the species were made, although the wing venation is practically the same, but the wing shape varies, being fairly constant in the various species.

There has been some confusion in the listing of Calephelis species. Carlos C. Hoffman in his Catalogue of Mexican Butterflies (1940) lists *velutina* and *craspidiodonta* under Calephelis. *Charis velutina* and *iris* has also been listed under Calephelis in Lepidopterorum Catalogus Vol. 38, 40, 41, 44 (Riodiniidae) by H. Stichel under the group or sub-generic name Iridiformes. Formerly *Charis iris* was listed by (Staudinger) under Calephelis in 1876 and also by Godman and Salvin Trans. of Ent. Soc. London 1880 and also by Godman and Salvin in Proc. Zool. Soc. of London in 1878. The above mentioned species are all hairy eyed, and they also do not look superficially like Calephelis, especially on the lower wing surface, and their genitalia is also quite different. However, the wing venation of the above species is quite similar to that of Calephelis. In the Revision I have shown photos of *Charis iris* and *Charis velutina* as well as drawings of male and female genitalia and wing venation, of these two species, for comparison with Calephelis.

For convenience in this Revision I have numbered the various species and their sub-species, this numbering beginning with the known recorded species, in order of their recording. However, due to lateness in getting the complete Revision to the printer, photo No. 11B ♀ abberation of *C. perditalis* and photo No. 18 ♀ allotype of *C. dreisbachi* are placed at the end of photos, after No. 39. In this Revision there is one colored plate showing three species of Calephelis, upper and lower surfaces, which is quite typical of coloration of all the Calephelis species. Throughout the Revision initials are sometimes used for the following Museums: U.S.N.M. = U.S. National Museum; B.M. = British Museum; A.M. = American Museum; C.M. = Carnegie Museum. In many places in the Revision the Calephelis species and sub-species, whether formerly published or new, are referred to only by their specific or sub-specific name.

In this Revision I have shown basic location maps of North and South America, indicating the countries and some divisions of same, but have not attempted to locate by symbol the various species and sub-species, as I feel it would only be confusing, as some of the species are concentrated in approximately the same location and the range of the species is clearly indicated in the descriptions. I have endeavored to publish everything by way of drawing and writing that I have learned about this genus.

Acknowledgements — I have received full cooperation from all of the museums in the United States and Europe and from many collectors, whenever I requested the same. Among the museums in the United States, the U.S. National Museum, Carnegie, American, Los Angeles County Museum, University of Arizona, University of Michigan, Michigan State University and Museums in Europe, the British Museum, Berlin Museum and Paris Museum. Among Lepidopterists and collectors are Dr. Geo. W. Rawson, H. A. Freeman, Cyril F. dos Passos, J.F.G. Clark, E. C. Welling, Dr. C. L. Remington, Dr. John A. Comstock, Dr. A. E. Brower, Don B. Stallings, Roy O. Kendall and wife, M. A. Richard, Dr. J. W. Tilden, Fred T. Thorne, C. M. Dammers (desc.), Lloyd Martin, Killian Roever, R. J. Jae, Bryant Mather, Ralph L. Chermock, Dr. Lee D. Miller, Dr. W. H. Wagner, J. F. Donohue, G. N. Ross, R. J. Wind, Otto Buckholz, Albert Pinkus, W. W. Newcomb (desc.), R. R. Dreisbach, (desc.), Dr. Tarsicio Escalante, Dr. Salvador L. de la Torre, Geo. P. Englehardt (desc.), and also G. E. Tite and N. H. Bennett of the British Museum. Harry K. Clench, F. Martin Brown and William Field have given me much assistance and have checked or read over the manuscript before publication. I am very grateful to all the above mentioned Museums and individuals and any others I have failed to mention, for their assistance and forbearance with me in this work.

PREPARATION OF GENITALIA AND WING VENATION SLIDES.

In the genus Calephelis all the species look so much alike that it is usually impossible to identify them by superficial examination, but fortunately in most of the species, the genitalia of both male and female show some constant structural differences and examination of the genitalia is the only positive means of identification.

The making of genitalia slides becomes necessary and the following method is suggested, most of which was outlined by

J. F. Gates Clark of the U. S. National Museum. Remove the abdomen of the mounted specimen by a quick downward thrust on the ventral side of the abdomen. Soak the abdomen in 10% K.O.H. overnight. Dissect out in water (using a syracuse watch glass, inside diameter 50 m. m.) carefully removing all foreign matter, remains of masculation and membrane. Most of the scales may be removed from the abdomen by the gentle application of a small camels hair brush and use of a couple of needles. The removal of the scales will at the same time force most of the undesirable material out of the abdomen. Remove parts to a second wash of water cleaning up and spreading (where possible) the valvae or harps. Then introduce 95% alcohol (in a watch glass) where the cleaning is finished (all remaining scales should come off in the alcohol). The genitalia will harden in the alcohol and should be held in the position desired for slide while in this wash and until they are firmly set. In some cases it is desirable to remove the aedeagus, and this can be done in the second wash of water but may be done in the alcohol. Allow parts to harden thoroughly in the alcohol (15 min. to one hour) and remove to clove oil (in a watch glass) to harden and clear. Avoid using the clove oil more than once or twice since it will become too diluted with alcohol and will be less effective. The genitalia should be allowed to remain in the clove oil until clear and hard, usually from fifteen minutes to a half hour will be required. Finally introduce into xylol (xylene) and wash out excess oil. Mount in balsam or permount (a registered trade mark of Fisher Scientific Co.) preferably the former (which is neutral in xylol), on a microscope slide depressed somewhat in the middle, and label carefully so that the slide and butterfly from which it was made may be easily associated by any one. A flat microscope slide can be used instead of one depressed in the middle, for the permanent balsam mount, and a thin round cardboard or plastic riser (outside diameter same as cover glass) can be used to retain the balsam, and which I believe allows for better placing and examination of the genitalia.

I find that the use of glycerine instead of balsam or anything else in the preparation of genitalia for quick study is very convenient. After the xylene wash as outlined above, the genitalia can be transferred to a flat microscope slide with four or five drops of glycerine and without using a cover glass. Dissection of the genitalia can be made then instead of in the water baths and drawings also can be made. This type of temporary slide will last for a considerable time without the glycerine drying up and

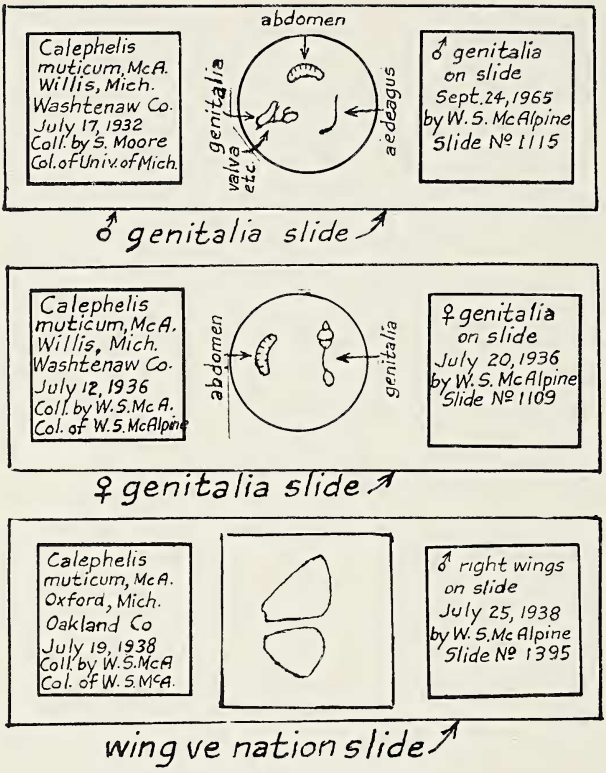


Figure 2.

Proposed genitalia slides

during this time the genitalia can be transferred to a permanent mount using balsam and round cover glass. If further time is needed to prepare a permanent slide the genitalia can be transferred to a small vial in some glycerine and can be kept there indefinitely.

In preparation of wing venation slides the following method is used. Remove the two right hand wings carefully from the butterfly so as not to break any parts adjacent to the abdomen. Dip the wings in alcohol to wet them. Then put them in standard solution of clorox (commercial sodium hypochlorite solution) and leave them there until color has been removed which is usually about ten minutes with Calephelis specimens. One must be careful not to over bleach them or the venation becomes difficult to see. After the wing is bleached out, put it in alcohol and leave it there until it floats. This is to remove the clorox solution and stop the bleaching action as well as driving out the water. Then place the wings, upper side up, on a thin coating of glycerine about three quarters of an inch wide across a flat microscope slide, arranging the wings in a natural position as shown in my illustration. A small camels hair brush can be used to advantage to place the wings in position and prevent folding. The glycerine will spread over the wings, and then a square cover glass can be placed over same and excess glycerne carefully pressed out, but not so much as to displace the wings. If too much glycerine is used there will be slippage of the cover glass. This type of wing venation slide can become permanent, but care must be taken in using same until the glycerine dries up around the edges of the cover glass. Possibly a more permanent wing venation slide can be made by using balsam or something else, as described previously, still I have found it impossible to make the wing venation slides with anything else except glycerine, with such small butterflies as Calephelis.

In the making of microscope genitalia and wing venation slides the following list of equipment is necessary; a compound microscope with wide range of magnification (from five to forty times) and having two eye lenses, the right hand lens showing a division of 196 squares, with fifteen lines on each side, and every other line being numbered from 0 to 7. This lens showing squares is very necessary for making accurate drawings, on the cross section paper; a small hand lens with magnification five or six times; slender pointed forceps or tweezers; small scapel (flat at end and slender pointed); dissecting needles 55 mm. in length; several syracuse watch glasses (inside diameter 50 mm.); several

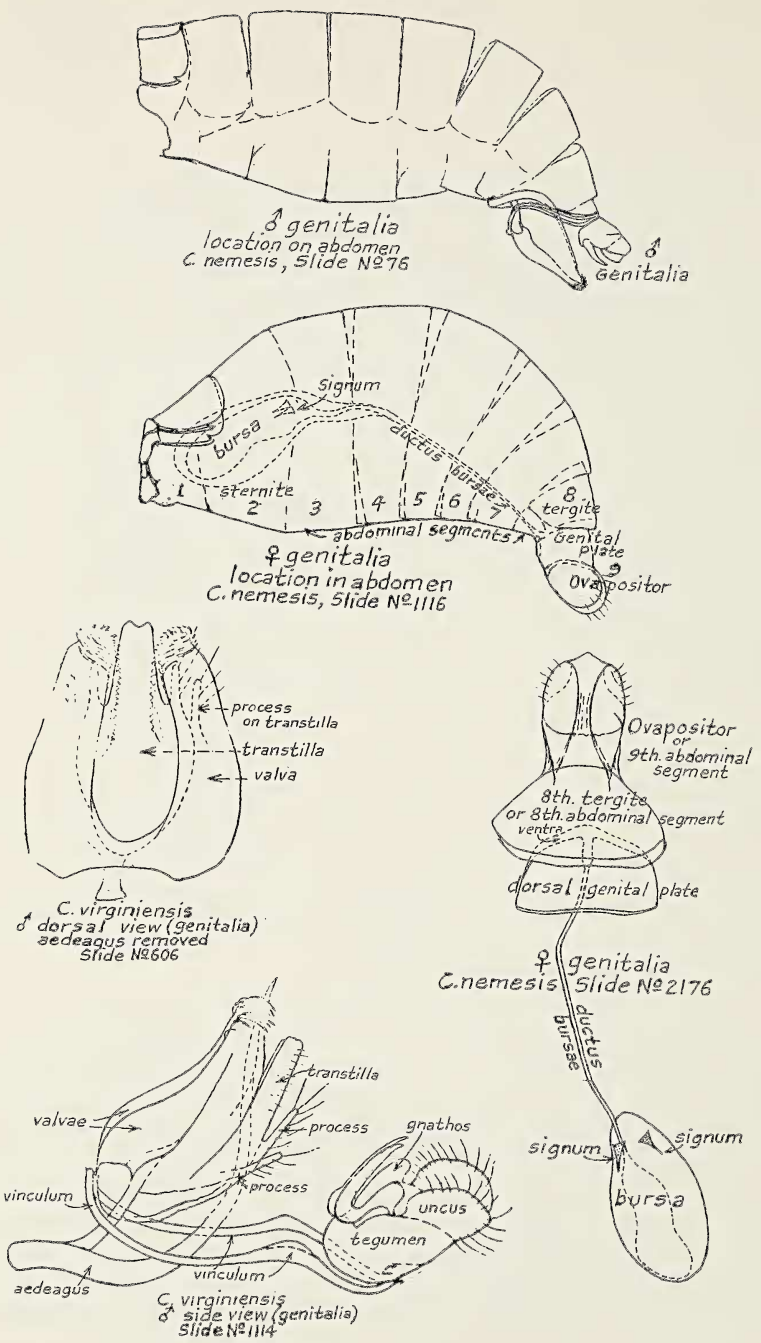


Figure 3.

Location and names of parts of genitalia.

small two inch vials; medicine dropper; shears; fine camels hair brush; small pocket knife; metal scale 6inch by 5/8 inch with 1/16 in. divisions and millimeter divisions; microscope slides 75 mm. by 25 mm.; cover slips (round 20 mm.); cover slips square (22 mm. x 22 mm.); No. 290 gillott pen points; slide labels 24 mm. x 24mm.; cross section transparent sheets with 1/8 inch squares; india ink.

A list of reagents needed is as follows: alcohol 95% solution; clorox (standard); K.O.H. 10% solution; Canada balsam; xylol (xylene) and clove oil.

There are several papers which have been published giving instructions for making genitalia and wing venation microscope slides among which are ones by J. F. Gates Clarke; Harry Clench with L. D. Miller; and J. H. Comstock; as follows:

"The Preparation of Slides of the genitalia of Lepidoptera" by J. F. Gates Clarke, Bull. Brooklyn Ent. Soc. 36:149-161, 1941.

"How to prepare slides of sclerotized parts of Lepidoptera" by Harry K. Clench and Lee D. Miller; Typed separate, issued by Carnegie Museum, Pittsburgh, Pa. 15213, Section of Insects and Spiders.

"Outline of Laboratory work in the Study of the Venation of the Wings of Insects" by John Henry Comstock, The Comstock Publishing Company, Ithaca, New York, 1918. Reprinted from "The Wings of Insects."

All the original drawings of genitalia and wing venation in this Calephelis Revision were made by the author, the genitalia being enlarged about forty times and the wings being enlarged about five times by using the 1/8 inch squares. The drawings are first made using a 3h pencil and later inked in with india ink, using a 290 gillot pen, for final photographing. In my final published drawings in this Revision the genitalia are enlarged about twenty times and the wing venation drawings are life size.

In the course of my work with the genus Calephelis I have made more than 2000 genitalia slides and preparations.

Figure 4.

North America showing boundaries of countries and locations referred to in text.

Figure 5.

South America showing boundaries of countries and locations referred to in text.

No. 1 **Calephelis virginiensis** Gray, 1832

Described in Griffith The Animal Kingdom Addn. Vol. 15, p. 58, Fig. 1a (1832) under name Erycina virginiensis, type in British Museum.

Syn. *Nymphidia pumila* Boisduval & Leconte, described in Hist. Lepid. Amer. Sept. Vol. 1, pp. 131 to 137, Figs. 6, 7 (1833) Type in U.S. National Museum.

Syn. *Calephelis louisiana* Holland, described in Entomological News, Jan. 1929, p. 20, Recorded as a Synonyn in Bulletin of Brooklyn Ento. Soc. Apr. 1937 by W. S. McAlpine. Type in Carnegie Museum.

One of our smallest species the male from 19-22 mm. in wing expanse, forewing 10 or 11 mm. Upper wing surface is of a uniform, rather bright light reddish brown with small blackish markings on basal half. As usual in this genus there are two marginal lines of metallic or silvery markings across both fore and hind wings, the inner line being more irregular and exserted at center of fore wing, while the outer line is straight and near the edge of wings. Between these metallic lines is a row of small dark spots. The metallic lines are not very distinct on the upper surface. There is no median dark band or shade across both wings as in borealis and some other Calephelis species. The lower wing surface is of a light tawny or ochre color with markings of the upper surface repeated, but much more prominent especially the silvery metallic lines, due to the lighter ground color. The fringes of the wings are light brown and not checkered.

This butterfly is similar in markings and color to muticum, but is smaller. The wing shape of fore wing of virginiensis in both sexes is rounded and quite similar, more so than in *muticum*, *virginiensis* is also somewhat similar to *perditalis* in both size and similarity of the sexes. The male genitalia differ distinctly from those of the other species, but the female genitalia are quite similar to those of *C. muticum*.

The life history of *virginiensis* has not been described, but Mr. M. A. Rickard of Houston, Texas has done some unpublished work on it, having found it near Houston, and reports its food plant is thistle. There is also an old record of its occurrence at Black Jack Springs, Texas. The type locality is Georgia, U.S.A. The male type by Gray and a series of four males and one female, all labeled Georgia, are in the B.M. The range of the species is the southern and southeastern United States, north to Virginia and Ohio, south to Southern Florida and west along gulf states to Louisiana and southeastern Texas to Houston.

No. 2 **Calephelis nilus** Felder (Moritz in litt) 1861

A doubtful species or "Species Inquirenda". Described as *Charis nilus* by Felder in "Wiener Ent. Monatschr" No. 4, April 1961, p. 100.

The original description in German is brief and very general, the type was described as a female, but later it proved to be a male.

The type in the B.M. is labeled as follows. A small circular hand-written label "Venezuela Moritz type"; a rectangular hand-written label *Charis nilus* Feld and a characteristic Felder label in brown backing *nilus* M.

There is a second specimen, in the British Museum, assumed to be in the original *nilus* type series, its abdomen is missing and the left hind wing almost entirely gone. On it a small circular label, "Venezuela Moritz". This specimen is somewhat larger than the male type but appears to be quite similar to the type in general appearance. Because the abdomen is missing it is impossible to even determine the sex.

The following is a brief description of type *nilus*. Primary wing expanse 20 mm., forewing 10 mm. There is no head on the type but it is a fairly good specimen with fringes worn but light brown in color, with some slight white checkering noticeable particularly on the lower wing surface. Color of upper wing surface chocolate brown, with basal half darkest, caused by the ill defined black markings which form about four irregular broken lines concentric wth the base, the outer of these lines being more discernible.

There are two outer lines of small metallic markings, which are somewhat leaden in color and not very prominent, between which is a row of rather prominent black dots. The lower wing surface is of a uniform light tawny color, slightly reddish, with all markings of the upper surface repeated and well defined, the metallic markings silvery. The outer basal line of black markings is single and not doubled as in the type of *perditalis,* but this doubling is not always true in other specimens of *perditalis* which I have examined. The wing shape of the male type of *nilus* is somewhat rounded as is usual in female Calephelis, so it is easy to understand how it could be mistaken for a female. As shown in the figures. It is more like that of *virginiensis* than either *perditalis* or *incaensis,* a new species which is found in Venezuela and adjoining areas.

The genitalia of the male type of nilus were very badly damaged when I last examined them in 1968, but when I first examined them in 1952 a couple of years after the genitalia slide was made, the genitalia appeared somewhat damaged with

transtilla split through the middle and spread out, but they still looked most like those of perditalis and not like the genitalia of any other specimens I had examined from Venezuela. It does not seem possible that type *perditalis* could be a synonym of *nilus* because of the great distance between type localities. *C. perditalis* being from Texas.

After examining the type of *nilus* in 1968 and its very badly damaged genitalia I have come to the conclusion that *C. nilus* is a very dubious species. It is impossible now to reconstruct an accurate drawing of the original genitalia, which are a principal means of identification of species in genus Calephelis.

No. 3 **Calephelis argyrodines** Bates 1866

Charis argyrodines H. W. Bates, Dec. 1866 "Entomologists Monthly Magazine", 3:154.

Calephelis argyrodines is one of the larger Calephelis averaging about 25 mm. in primary wing expanse. The male type is in the British Museum and is a badly battered and worn specimen, with upper surface a rather uniform chocolate brown in color with slightly darker basal half and indication of a median darker patch in primaries. The two marginal lines of metallic markings are barely discernible and the black dots between are only partly discernable. The whole upper surface is not a smooth brown, but inclined to be spotty. There is no noticeable white checkering of the fringes that remain, and they are mostly worn off. The lower surface of type is not worn so much and is of a rather light reddish brown or tawny color. Both silvery and black markings are readily discernible.

The original description of *Charis argyrodines* is as follows: "♂ Exp. 10"12". Closely allied to the North American *Ch. ceneus* Lin. (*virginiensis*. Bois. et Leconte) agreeing with it in color both above and beneath, but differing in the forewing being much more elongate and pointed. Above, obscure dark brown crossed by numerous short fine dark streaks, which are generally connected together as fine wavy lines, towards the outer margins is a row of small black spots, and there are two extremly fine and indistinct silvery lines, the inner one of which is strongly waved, the fringe is dark brown indistinctly spotted with ashy. Beneath tawny yellow, the fine black streaks and spots more distinct than on the upper surface, silvery lines much broader. Eyes naked. Guatemala also Nicaragua."

The male type has three original labels on designated as follows. A hand-written black edged rectangular label. "Type of *Charis argyrodines* Bates", a printed rectangular label, "Duenas Guatemala, F.D.G., & O.S.", a printed rectangular label, "B.C.A. Lep. Rhop., *Charis argyrodines* Bates, Godman-Salvin Coll. 1914-5", there is also an additional male genitalia slide label.

Because of the rather battered male type specimen and its

badly twisted genitalia on a slide made in 1947, which made it difficult to make an accurate drawing of same, I have assumed a male specimen from type locality Duenas Guatemala which is in the British Museum, to be a topotype, as it agrees well in size 25 mm. in primary wing expanse, forewing 13 mm. and in color and shape of wings with the male type, and it also agrees well with the original description. It has on it an identical printed label, "B. C. A. Lep. Rhop: *Charis argyodines* Bates Godman-Salvin 1914-5" as is on the original type specimen. I have also assumed a female specimen which is in the British Museum, from type locality Duenas, Guatemala, which has on it an identical printed label, "B. C. A. Lep. Rhop. Charis argyrodines Bates Godman-Salvin 1914-5" as is on the original type specimen, as a female of this species, it having a primary wing expanse of 26 mm., forewing 13 mm. The genitalia of both the male topotype and the assumed female are figured.

I have seen specimens that agree well both superficially and in genitalia with argyrodines but having a slight dark median irregular shade or band across both wings to a greater or less degree, which is not evident in the worn type. Also the fringes in some specimens of *C. argyrodines* are more checkered with whitish than in others. *C. argyrodines* looks very much like *C. costaricicola* Strand as reproduced in the topotype but there are some considerable differences in genitalia of both male and female as shown in drawings of same.

The male genitalia differs principally in shape of valvae which is slimmer and not rounded as in *costaricicola* and the end of the transtilla is also slimmer. The posterior edge of female genital plate is heavier than in costaricicola. In the original description and figures *costaricicola* is considerably smaller than argyrodines, but the type of *costaricicola* appears to be a rather dwarf specimen. I have a large series from Guatemala that are much larger and about the size of *argyrodines.*

No. 4 **Calephelis borealis,** Grote and Robinson, 1866

Nymphidia borealis, Grote and Robinson, 1866, Annals of New York Lyceum of Natural History, 8:351

Calephelis borealis is one of the larger species of this genus being 25-30 mm. in wing expanse, forewing 14 to 15 mm. The basal half of upper surface is of a dull brown chocolate color, upon which are small black markings which form four or more broken lines concentric to the base, the outer basal line being the outer edge of a suffused but rather prominent dark brown shade or band across the middle of both wings followed by a

submarginal area of a lighter reddish brown shade. The two silvery lines of metallic markings in this submarginal area are not very distinct, the inner one being heavier and waved while the outer line near edge of wing is straight and fine. Between the two silvery lines is a line of rather prominent black dots. The fringes are light brown and usually checkered with white at apex and inner angle of the primaries.

The lower surface is of a pale orange color with all markings of the upper wing surface repeated but much more prominent than on upper surface due to the lighter background. The genitalia characters of both male and female are good. Its life history was partially worked out by Cyril F. dos Passos and published Aug. 1936 in the Canadian Entomologist. The egg is turban shaped and the larvae is fringed with long white hairs as well as having two mid dorsal rows of similar long white hairs projecting upward. This species is single brooded, adults appearing in early July. There are nine caterpillar stages and it hybernates for the winter in the fourth stage. Its life history is quite similar to that of *C. muticum*. *C. borealis* occurs in open woods on higher ground usually near small streams where its food plant Senecio obovatus occurs.

The range of this species is Southern New England, south to Virginia and west through Indiana and to Missouri, by my records. Type locality is near Upper Coldenham, Orange Co., New York, about 9 miles west of Newburg on the Hudson. I have been unable to find out where the type or type series were deposited.

No. 5 **Calephelis nemesis** Edwards 1871

Charis nemesis, W. H. Edwards 1871, Transactions of American Entomological Society, 3:212.

This is one of our most complex species. It was described from one male specimen taken by Dr. Palmer in Arizona, with no exact location. F. Martin Brown has written a paper about Edwards types in Carnegie Museum which is very complete.

Edwards complete description is as follows in quotes.

"Male expanse one inch, upper side pale brown, the basal half a shade darker and limited on middle of both wings by a wavy outline. Underside pale fulvous, both wings crossed by two marginal lines of plumbagious point, a third line of black non-metallic points crosses the disks and a fourth is basal."

While Edwards' description seems to lack detail, still it appears to fit very well one male specimen in the Edwards collection labeled *nemesis* Arizona in Edwards' own handwriting, although there are some other specimens labeled nemesis by Edwards in his collection that agree in a general way. I have designated this

specimen, which is rather worn, as neotype, with identifying label, and it is possible that this specimen may be the original type specimen described by Edwards. Following Edwards' description he states this single male specimen was in the Department of Agriculture, which was later transferred to the U.S. National Museum, but there is no record of this specimen being there. I have another somewhat fresher specimen taken at Tucson, Arizona by the late George P. Englehardt on April 1, 1935, that fits the original *nemesis* description very well. It is quite possible that the Tucson area is the type locality of *C. nemesis,* as Dr. Palmer was known to have been there in the Fall of 1867 and 1869. This specimen is a possible topotype of *C. nemesis.* There is a female specimen from Picket Post Mt. north of Tucson which is a possible female of this species. The size of the possible male topotype primary wing expanse 22 mm. The size of the female above referred to is primary wing expanse 18mm. These two specimens with permission of original collectors will be deposited in the Carnegie Museum.

Having seen many specimens of Arizona *nemesis,* it appears that Edwards type *nemesis* is an extreme variant of that species, as the usual black dots between the marginal and sub-marginal metallic lines are missing or only just slightly discernible near anal angle of secondaries and Edwards does not mention these black dots in his description. A comparison and description of the average *C. nemesis* as compared with *C. nemesis australis* sub-species is given in my *C. nemesis australis* sub-species description in this Revision.

The life history of *C. nemesis* from Arizona has never been worked out to my knowledge.

In this publication I am naming four sub-species of *C. nemesis* as follows: *C. nemesis australis, C. nemesis californica, C. nemesis dammersi and C. nemesis bajaensis* based mostly upon slight constant genitalia differences and other fairly constant superficial differences from original type *nemesis.* Life history work is very desirable in the various sub-species of the complex species *C. nemesis* to further verify their status.

The range of *C. nemesis* and its various sub-species appears to be Texas, Arizona, California and adjoining areas including parts of northern Mexico.

No. 5A **Calephelis nemesis australis** Edwards (new status)

Charis australis W. H. Edwards November 1877 Field and Forest 3:87.
Syn. *Charis guadeloupe.* Strecker March 1878 Lepidoptera, Rhopolaceres and Heteroceres: 131.

Edwards description of *Charis australis in* 1877 was much more

detailed that that of *Charis nemesis* in 1871. A condensed description of Edward's *Charis australis* is as follows: Male expanse of wing 0.9 inch, size and shape of *C. nemesis,* with primaries pointed at apex. Upper wing surface rather uniform reddish brown with basal half a shade darker due to four or five irregular convex lines of broken faint black markings, that extend across both primaries and secondaries, its outer margin being the outer convex irregular line. Usually on the inner side of this outer irregular line is a narrow irregular dark shade or band across both primaries and secondaries, this shade being broader near upper discal area of primaries. The usual two lines of marginal and sub-marginal metallic markings together with a well defined row of black dots between them, extend across both primaries and secondaries. These black dots being located nearer the outer marginal line of metallic markings. The outer marginal metallic line is fine and straight, near outer edge of wing, while the inner sub-marginal metallic line of markings is heavier and broken at the veins, and outwardly exserted near center of the wing, but not so much as in *C. virginiensis.* These metallic lines are just barely discernible on the upper wing surface. The lower wing surface is light fulvous and all markings of the upper surface are repeated, and are prominent due to light background, especially the two lines of metallic markings which are silvery.

The female is a little larger than the male with metallic markings heavier and more prominent on the lower wing surface and the shape of primaries are rounded and squared off at apex. Edwards received his type series of *C. australis,* which consisted of four males and three females from Jacob Boll, who collected them at San Antonio, Bexar Co., Texas. This type series of specimens in the Edwards collection at Carnegie Museum was first examined by me in Nov. 1937 and then consisted of three males and three female specimens which were all similarly labeled australis, in Edwards handwriting. Both males and females were quite constant respectively, with the exception of one male specimen which was illustrated by Holland 1898 in his Butterfly book, Plate 28, Fig. 14, as *C. nemesis* on his plate explanation, although in his text he referred to it as *C. australis.* Later, in Holland's 1931 edition, the same specimen was illustrated on Plate 28, Fig. 14 as *C. australis.* This specimen was not one of the original type series collected by Boll at San Antonio but rather a specimen from Arizona selected by Holland to illustrate *C. nemesis.* This specimen is not *C. nemesis* or *C. australis* but a new species *C. arizonensis,* as was proved by genitalia examina-

tion, and I have labeled it as such. I have designated one of the undoubted males of this type series as a lectotype of *Calephelis australis* and have labeled it as such and have also designated one of the females of this type series as a syntype of *Calephelis australis* and have labeled it as such.

Barnes and McDunnough in Contributions to Natural History of Lepidoptera of North America, Vol. 3, No. 1, p. 103 in 1916 considered *C. nemesis* Edwards and *C. australis* Edwards to be the same species. After examination of many specimens of *C. nemesis and C. australis* and their genitalia I would agree that both belong to the same complex species but that *australis* is better considered a subspecies of *nemesis* because of its constancy in general markings (some of which differ from the original description of *nemesis*) and because of some rather slight but constant variations in the genitalia. The overall pattern of genitalia of both male and female of *nemesis* and *australis* is practically the same.

A comparison between *nemesis* and *australis* would indicate that usually the upper wing surface of *australis* is more uniform light reddish brown than in *nemesis,* where it is more chocolate brown. In *australis* there is sometimes an irregular but subdued rather narrow dark shade across middle of both wings (hardly discernible in some specimens) while in *nemesis* this irregular median dark shade or band is always present and wider and much more prominent than in *australis* and the limbal and apical area are often of a contrasting lighter shade than in *australis.* The small black dots between the marginal and sub-marginal lines of metallic markings are always present and usually well defined in *australis* while these spots are sometimes missing (as in the type specimen of *nemesis*) or ill-defined and only faintly discernible as in some other specimens of *nemesis* from Arizona, but in other specimens of *nemesis,* probably the majority, these black spots are present, but not so well defined as in *australis.* The fringes are faintly checkered with white, particularly in wing primaries of both *nemesis* and *australis.*

The general range of *C. nemesis australis* is Texas and bordering Mexico and possibly adjoining states. There is a record of its capture near Mobile, Alabama, (a pair in collection of W. P. Comstock at the American Museum, dated Sept. 10, 1970), but inquiry of Dr. Ralph L. Chermock, University of Alabama, says (in lett.) that he has no other records for the State and that these specimens may have been temporarily introduced with nursery stock or may have been mis-labeled. Mr. Bryant Mather of Jack-

son, Mississippi has no record of its occurence in that State.

A somewhat similar form of *C. nemesis* found at Blythe, California, I am naming in this Revision as *Calephelis nemesis dammersi.* Although *C. nemesis australis* is prevalent in the Texas area, there is a restricted area near Pharr, Texas, where specimens appear to be nearer to nominate *nemesis* than to *australis,* especially in pattern of male genitalia. The life history of *C. nemesis australis* has not been recorded but its food plant is *Clematis drummondi* by my observation and there may be other food plants.

Barnes and McDunnough in Contributions to Natural History of Lepidoptera, Vol. 3 published in Nov. 1916, state that Herman Strecker described *Charis guadeloupe* about 1877 or 1878 from specimens received from Jacob Boll who collected them at San Antonio, Texas. This is the same locality and the same collector from which Edwards had received previously his type series of *C. australis.* Barnes and McDunnough considered Strecker's *Charis guadeloupe* the same as Edward's *Charis australis,* but considered *C. australis* had priority in publication and therefore *C. guadeloupe* was a synonym of *C. australis.*

I have seen and examined Strecker's typeswhich consist of two males and one female at the Chicago Museum and find after careful examination including genitalia that they are the same as Edward's *C. australis.*

In compiling my records and information on *Calephelis nemesis* and its subspecies *australis,* I am greatly indebted to F. Martin Brown of Colorado Springs, Colorado, who has made a very complete study of Edward's life, works and correspondence and has supplied me with much valuable information regarding them.

No. 5B **Calephelis nemesis dammersi,** McAlpine, new sub-species

In June of 1939 I corresponded with the late C. M. Dammers and received some specimens from him of a little metal mark found at Blythe, Riverside Co., California, which appeared to be different than typical *Calephelis nemesis californica* McAlpine. I received a total of twenty-one such specimens from Mr. Dammers, all taken during the end of July (27th to 30th) in 1929, 1930, 1931 and 1935.

At that time he also sent me a single female specimen from the same locality dated Oct. 7, 1929, which was about the same size as the other specimens, but appeared more like *C. nemesis californica,* in coloration, and in having a small and rather indistinct median dark band across the wings. An examination of the

genitalia of this latter specimen shows that it is closer to *C. nemesis californica.* I received no other specimens from Blythe except the above mentioned ones, so in the latter part of July 1964 I went to Blythe and collected in the area where Mr. Dammers had taken his specimens but found no Calephelis.

In my last correspondence with Commander Dammers in March 1943, he states, "Blythe is a city on the banks of the Colorado River at the eastern end of Riverside Co., Cal., although it is in a desert area the banks of the Colorado River have marshy flats at its sides and the food plant of (*C. nemesis californica*) which is Baccharis glutinosa, grows there in quantity. It is a plant that is found in damp places and some desert washes and is widely distributed over Southern California. At Blythe I have taken both forms in exactly the same spot at different times of the year and never found them flying together and *C. nemesis dammersi,* only in mid-summer. *C. nemesis californica,* I know, has several broods a year. "I believe I am the only one who has made captures of *C. nemesis dammersi,* new sub-species and only at the one spot and always in mid-summer and could not find it at other times of the year." He also states in this letter, "I had hoped to work out the life history of *C. nemesis dammersi,* and definitely find out if it is different than *C. nemesis californica."*

The Blythe specimens look quite different from *californica* being of a lighter basic color and quite like *C. nemesis australis.* The genitalia of both male and female seem to have some slight constant diffferences from *C. nemesis californica,* it has a desert habitat and appears to be on the average a somewhat smaller insect. Typical *C. nemesis californica,* flies in July in other localities but not in Blythe. Because of all these facts I believe that this apparently isolated Blythe population is worthy of subspecies status.

Male holotype, primary wing expanse 22 mm., forewing 12 mm. Upper wing surface of a uniform light brown or tawny color being a lighter more reddish shade of brown than in typical *C. nemesis californica,* which is more of a chocolate brown color. The usual blackish markings, show up better than in typical *C. nemesis californica.* On the basal half of both wings these blackish linear markings form four or five irregular transverse lines across the wings which are more or less concentric with base, the outer of these lines being slightly heavier and exserted at the middle of both wings.

There is no well defined median dark band or shade across the wings as in *C. nemesis californica,* although there is a trace of

some, evidenced by a small slightly shaded irregular spot along inner edge of outer basal transverse line just above middle of forewing. Some specimens of the male paratypes are of a somewhat darker brown shade than in the holotype, and most of the female paratypes are also of a slightly lighter shade of brown than the allotype. There is the usual marginal and sub-marginal row of metallic markings, silvery in color, but only faintly discernible, between which is the usual row of small black dots. The outer metallic line is straight and finer than the inner metallic line which is heavier and broken at the veins. The fringes are light brown faintly checkered with whitish. Top of head light brown, eyes darker brown, antenna dark brown ringed with white at joints, club black, thorax and abdomen are concolorous with upper wing surface.

Lower surface: the legs, thorax, abdomen and lower wing surface are of a light uniform ochre or yellowish color, considerably lighter than the upper wing surface. All markings of the upper wing surface are repeated and are more definitely defined due to the light ground surface, and the metallic markings are silvery and prominent.

The outer basal irregular transverse line of small linear markings is single and not apparently doubled or shaded inwardly as in *C. nemesis californica.*

Female allotype, primary wing expanse 22mm., forewing 12 mm. Very similar to male holotype in color and markings on both upper and lower surfaces. The shape of the primaries are more rounded or square cut and tip not so pointed as in male.

Nothing is known of its life history but evidently Commander Dammers thought that its food plant might be Baccaris glutinosa which is the food plant of *C. nemesis californica.*

A comparison of the genitalia of several specimens of *C. nemesis californica* and of *C. nemesis dammersi,* indicates that in the male the transtilla is inclined to be angled at the middle and blunted at the end in *californica,* while the sides are straighter and the end pointed in *dammersi,* as in *australis.* In the female genitalia the posterior margin of the anterior genitalia plate is flatter and slightly depressed at the middle in *dammersi,* while in *californica* this margin is decidedly angled and rounded off at center. It would appear that in genitalia and in general appearance that *C. nemesis cailifornica,* resembles most typical *C. nemesis,* while *C. nemesis dammersi,* resembles most *C. nemesis australis.*

The holotype and allotype will be deposited in the Los Angeles

County Museum, and paratypes in U.S.N.M. and elsewhere, with permission of the owners.

No. 5C **Calephelis nemesis californica** McAlpnie, new sub-species

Because of the well marked constancy of California specimens of the complex species *Calephelis nemesis* Edw., it would appear that the California *nemesis* population, with exception of some found in the Blythe area, could well be considered also as a subspecies, and especially because of constant additional markings that are not referred to in the original description of *C. nemesis,* and which do not occur in my designated neotype of *C. nemesis* from Arizona.

Male holotype: Primary wing expanse 24 mm., forewing 13 mm. Upper wing surface basic color pale chocolate brown. Both primaries and secondaries being crossed in the middle by a prominent irregular darker brown shade or band. On the basal half of both wings there is a series of dark brown or blackish linear markings which form four of five irregular transverse lines across the wings which are more or less concentric with base, the most outward of these transverse lines is the heaviest and forms the outer margin of the median dark band or shade previously referred to. These basal blackish markings cause the basal half of the wings to have a darker shade than the balance of the wing surface. Outwardly beyond the median dark band are two fine silvery or coppery colored metallic lines of markings which are barely discernible, between which is a row of fairly prominent black dots. The outer metallic line is fine and quite straight being parallel to outer edge of wing, while the inner metallic line is heavier, broken at the veins, and outwardly exserted near middle of the primaries. There appears to be a small darker shade at tip of primaries intensified by the black dots referred to previously. The outer edge of primaries is undulated. Fringes are light brown very faintly checkered with whitish, which is more descernible on lower wing surface. Top of head, thorax and abdomen are dark brown, eyes lighter, antenna dark brown ringed with white at the joints, with club black.

Lower wing surface, legs, head, thorax and abdomen are of a fairly uniform light tawny color. All markings of the upper wing surface are repeated, only much more prominent due to the lighter ground color. In some specimens there is descernible three very fine metallic markings along the costa of primaries, preceding the inner metallic line. There is usually a slight variable darker narrow shading, being broader at apical area of primaries,

along inner edge of outer basal transverse line, which gives the appearance of this line as being doubled in some cases.

Female allotype: Primary wing expanse 25 mm., forewing 13 mm. Very similar to male in markings, color and shading on both upper and lower wing surface. It is larger somewhat than the male and shape of primary wings are more rounded or square cut and tip is not so pointed as in male. There is evidently a form of this sub-species which is of a light uniform reddish brown color on the upper wing surface, but with no median irregular dark brown shade or band across the wings, but with the metallic markings well defined. The lower wing surface of this form is a little lighter pale yellow color than in typical sub-species *californica* and the black markings are not so heavy and the outer basal line of black markings is single and not divided or shaded on the inner edge. Mr. Dammers sent me two female specimens of this form collected by him, one from Gypsum Canyon, Orange Co., Cal., dated July 27, 1927, and the other from Riverside dated June 1, 1930.

I have seen a series of fifty-five specimens, forty-five males and ten females from counties in California lying in or south of Los Angeles County, California. The dates of capture of these specimens range from late June to the early part of October. The genitalia seem to be quite constant in both male and female, following the general pattern of *C. nemesis* but with some constant variations, not mentioned in the original description of *nemesis*, such as the dark spots between the two metallic lines which are prominent in *californica*.

A partial life history of *C. nemesis californica* sub-species is recorded in Vol. 31, Part I, 1932, Bulletin of the Southern California Academy of Sciences by Dr. John A. Comstock and C. M. Dammers. Its food plant is *Baccharis glutinosa* Pers. and it is at least double brooded.

I am particularly indebted to some private collectors in California, in addition to the Los Angeles County Museum for use of material and information namely the late C. M. Dammers, Dr. John Comstock, F. C. Thorne, Lloyd Martin and Christopher Henne.

The holotype and allotype will be deposited in the Los Angeles County Museum, and paratypes in U.S.N.M. and elsewhere, with permission of the owners.

No. 5D **Calephelis nemesis bajaensis** McAlpine, new sub-species

In November 1966, I received fifty-five Calephelis specimens from Carnegie Museum that had been collected in October, November and December 1961 near the southern end of Baja in Mexico by the Cary-Carnegie expedition. Most of the localities are labeled Ro. Palmarito, A. San Bernardo, Sierra Laguna and San Jose del Cabo. All of the specimens, except one (which proved to be *Calephelis wrighti*) were evidently *Calephelis nemesis,* being very similar in size, coloration and markings on both upper and lower wing surfaces to *nemesis californica.* I examined the genitalia of thirty of these specimens, nineteen males and eleven females. In examination of the male genitalia I was particularly struck by the slimness and extreme length of the valvae, as well as the heavy armature at its posterior end, thus differing from the usual *Calephelis nemesis* from other localities. The balance of the male genitalia, transtilla with processes, etc. were similar to those in *C. nemesis* from other localities. The general pattern of the female genitalia is quite similar to that of *C. nemesis californica* and *C. nemesis* from some other localities.

As accurate specific and sub-specific determination in the genus Calephelis is largely based upon constant structural difference in genitalia, rather than superficial characters of the butterfly which are very similar in all the species. It would appear that this small somewhat isolated population of *C. nemesis* with its constant structural variation in male genitalia, as stated above, should be considered a sub-species.

The holotype and allotype will be deposited in the Carnegie Museum and some of the paratypes will be deposited in U.S.N.M. and other museums with permission of Carnegie Museum.

No.6 **Calephelis laverna** Godman and Salvin 1880

Charis laverna Tran. Ent. Soc. 1880, p. 125.
Charis caenius, synonym Godman and Salvin.

Male type, wing expanse 25 mm., forewing 11 mm. Coloration of the upper surface is a rather bright light reddish brown, with the usual black basal markings fairly well defined forming four or five black broken lines concentric with the base, the outer line being slightly heavier and inclined to be shaded inwardly to form sometimes an indistinct narrow black shade or band midway across both wings.

The two marginal metallic lines are silvery and rather prominent and the black dots between them are fairly large and well defined. The inner line of these metallic markings is heavier,

irregular and more noticeably broken at the veins than the outer metallic line. The inner metallic line is also decidedly exserted outwardly between median veins 1 and 2 as in *C. virginiensis* and several other Calephelis species. The light reddish brown basic color of upper wing surface is particularly noticeable between the two metallic lines. The black dots between the two marginal silvery lines are located nearer the outer silvery line. The fringes are pale brown with occasionally one white checker spot near apex of primaries in both sexes, which is only noticeable in fresh specimens. The antenna are black, ringed with white at the joints. It would appear that the summer broods are somewhat brighter in color than the winter broods.

The color of the lower surface is a light reddish brown, with all markings of the upper surface repeated and well defined, the two silvery lines being particularly prominent.

The female which is found in company with specimens similar to the above described male, has upper and lower surfaces similar in coloration and markings to the male. The shape of the wings of the female are more square cut and rounded than in the male, the primaries of the male being slightly narrower with tip somewhat pointed.

The genitalia of both male and female are well defined and fairly constant in specimens from near the type locality V. de Chiriqui. It is also recorded from Venezuela, Colombia, Ecuador and adjoining Brazil. However, there seems to be a constant noticeable difference in the female genitalia and to some extent in the male, in specimens of *laverna* from Trinidad and adjoining Venezuela so I have proposed that these be designated as a new sub species *trinidadensis.*

The male type of *Calephelis laverna* is in the British Museum and they have a large number of specimens of this species obtained from various collectors over the many years. I have examined and made genitalia slides or preparations of more than 80 specimens of laverna and its sub species *trinidadensis,* received principally from the British, American and Carnegie Museums. Paratypes will be deposited in U.S.N.M., A.M. and C.M. with permission of the owners.

No. 6A **Calephelis laverna trinidadensis** McAlpine, new sub-species

Male holotype, primary wing expanse 23 mm. forewing 12 mm. Coloration and markings of upper and lower surface and shape

of wings and fringes are very similar to *C. laverna.* The shape of wings and fringes are also similar to type of *C. laverna.*

In the male genitalia compared with nominate *laverna,* the valvae are a little more robust with usually not so much armature at the posterior end, the transtilla is much shorter and not so slender and pointed, and not as curved laterally at posterior end.

Female allotype, primary wing expanse 23 mm., forewing 12 mm. Coloration and markings of upper and lower surface similar to male holotype. The females are usually slightly larger than the males, and the shape of the primary wings is more rounded and square cut.

In the female genitalia the complete genital plate is flatter and the posterior part of the plate is also flattened and not so elongated as in female of typical laverna. The genitalia characters are quite constant in this sub species.

The range of this sub species of *C. laverna* is Trinidad and adjoining Venezuela. I have examined and made genitalia preparations of 24 specimens of this sub species. The type locality is St. Ann, Trinidad, British West Indies, while the allotype is from Botanical Gardens, Port of Spain, Trinidad. The holotype and allotype are to be deposited in the American Museum and some paratypes are to be deposited in U.S.N.M., B.M. and C.M. and some others with permission of the owners.

No. 7 **Calephelis fulmen,** Stichel 1910

Berliner "Entomologische Zeitschrift," Vol. 55, page 103.

An English translation of his description is as follows:

"Habitus as *C. iris* (Stgr.) Apex of forewing somewhat produced. Wing above deep brown, distally somewhat lighter reddish brown, in basal area of both wings indistinct black crosslines, beyond the middle a blackish band. Near the distal margin a row of black spots, which are enclosed on both sides by a silver line. The one nearest body of these lines in the forewing strongly zigzag, in the hind wing strongly bowed and wavy, the outer one parallel to the wing border. Underside light red brown. Both wings in the basal half, with 4 fine black lines more or less arched, partially puntcate, in general however, more continuous than in related species. In the outer part are two silver lines which are proximally less zigzag than above, stronger than those running parallel with the border, black spots between the two, in the fore-wings indistinct. Fringes brown, interrupted by white in places in the fore-wing. Length of forewing 14 mm. Type 1 ♂ No. 3485 Costa Rica, (San Carlos) 1 c.m."

The Zoological Museum of Berlin in 1963, through the late Prof. Eric M. Hering and his successor, Dr. H. J. Hannemann, was most cooperative in sending me the type of *Calephelis ful-*

men, together with another male specimen of fulmen, with Stichel's label and identified by him as *C. fulmen* according to Dr. Hering. They permitted me to make genitalia slides of these specimens. Photographs of the type were also sent.

I have carefully examined the type of *Calephelis fulmen.* There are four labels on it as follows: printed label, white with black border, Costa Rica, San Carlos, C. C. H. Stichel., printed label, red with black border, Typus., printed label white, 3485., very large pale green label with black border (hand written by Stichel) *fulmen* Stichel.

The othe specimen of *C. fulmen* has three printed labels: (1) white label with black border, Chirique Ribbe, (2) white label, 2493, (3) white label with black border, C. C. H. Stichel. The two specimens look quite alike superficially the latter specimen being slightly smaller in wing expanse. The above description of *Calephelis fulmen* by Stichel is quite good and his type and the other Stichel specimen is about average size in wing expanse about 24 mm., forewing 13 mm.

The apex of the forewing in his type is not produced as much (not so falcate) as in some other specimens. This falcate wing apex seems to be a main superficial distinguishing characteristic of the *C. fulmen* group. Another very noticeable feature of the upper surface of *fulmen* is the very prominent irregular dark median band across both wings and the three large black spots with dark shading located between the two silvery lines at the apex of the primaries. The fringes are concolorous with upper surface and lightly checkered with white, more distinctly near apex and outer angle of primaries. The lower surface of type *C. fulmen* is of a uniform pale reddish brown color with markings of upper surface repeated and well defined. The outer basal line or median line of small broken black markings is single and not shaded.

In examination of the genitalia of the type and the other specimen referred to, it was noted that tip of the abdomen of the type, had been broken off or removed before I received it and what was left was of little use. However, a good genitalia slide was made of the specimen from Chiriqui, known also as Volcan Chiriqui, Panama, which is not far from type locality San Carlos, Costa Rica.

The specimen from Chiriqui is quite similar to the type in general markings and size, although the silver markings on the upper wing surface are faint as compared with the type. The genitalia of the type are lost or destroyed, and this specimen

was identified by Stichel as *C. fulmen* according to Dr. Hering. In view of these facts I have selected the Chiriqui specimen as a neotype of *Calephelis fulmen*. The original description of the type by Stichel, with the additions I have called attention to, would apply well to this neotype.

The genitalia of this neotype of *Calephelis fulmen* is distinctly different from all the other species of Calephelis, in having the anterior lateral finger-like process, one of two that occur on each side of the transtilla of the valvae, very long, and extending well over and beyond the other two posterior processes. *Calephelis fulmen* typifies this distinctive constant character of a very long anterior finger-like process on the transtilla and I propose calling this group the fulmen group, two other species mexicana and sixola also belong to this group. The butterflies of this group all look superficially like the usual Calephelis species, and the wing venation is the same and the other genitalia characters are also quite similar with the above named exception. There is slight variation in the length of the finger-like processes on the transtilla in some other Calephelis species, but nothing approaches the extreme length of the anterior processes as occur in the fulmen group.

There appears to be considerable variation in genitalia of both male and female of *C. fulmen* in different localities, but present knowledge is insufficient to warrant sub specific recognition. However because of this variation in a considerable series of specimens from Tabasco, in the Yucatan Peninsula and British Honduras a sub species may be warranted from this area. Life history work in the fulmen group is desirable and would help determine this. My figures of the genitalia of both male and female of *C. fulmen* show some of these variations but the general pattern of the genitalia is quite similar in all of them.

Females of *Calephelis fulmen* are very similar to the males in general markings, but are a little larger in wing expanse, the average being about 26 mm. forewing 13 mm. In the female the primary wings are more rounded and square cut than in the male, and the wing tip is produced or falcate as in the male.

Females of this species have been determined by superficial characters that are similar to the male, and by congruence of localities. The female genitalia of *C. fulmen* are not so well defined as in the male. There are some comparatively small variations in different populations, but the over all pattern is much the same.

I have examined and made genitalia slides or preparations of seventy specimens of *C. fulmen* of which fifty were male and twenty female. There is considerable variation in extreme sizes of both male and female. The basic coloration of upper surface varies in light or dark brown shades, but the markings as outlined are quite constant.

The known distribution of *C. fulmen* is through Central America, as far south as Panama and north through Nicaragua, Honduras, Guatemala, British Honduras, and in Mexico, through the Yucatan Peninsula on the south, and north through the states of Chiapas, Oaxaca, Guerrero, Veracruz and San Luis Potosi.

The original type and proposed neotype will be deposited in The Berlin Museum and paratypes in U.S.N.M., C.M., A.M. and Mex. Nat. Mus., B.M. and some private collections, with consent of the owners.

No. 8 **Calephelis mexicana** McAlpine, new species

Calephelis mexicana belongs to the fulmen group and looks very similar to *C. fulmen,* the main means of certain identification being in the genitalia.

The male genitalia of *C. mexicana* differ from those of *C. fulmen* in the length of transtilla, which does not extend over the end of the valvae, and is usually slightly notched at its end, and also in the general shape or pattern of the valvae as shown in my figure.

Male holotype primary wing expanse 25 mm., forewing 15 mm. (which is about maximum wing expanse of material I have examined). I have examined and made genitalia slides or preparations of twenty-five male specimens and find there is considerable variation in size. The smallest of the male specimens is 21 m.m. in wing expanse. Most of the material is not in very good condition. The holotype however, is a nearly perfect specimen. It is in collection of C. C. Hoffmann, No. 2251 in the American Museum and was collected at Mirador, Veracruz, Mexico, May 25, 1908. The outer edge of the forewing is squared off at the middle and its apex is rather prominently produced or falcate, which is a distinguishing character of the *fulmen* group.

The basic color of the entire upper wing surface is of a rather light chocolate brown, which varies in intensity in specimens. There is a prominent dark brown irregular median band or shade across the middle of both primaries and secondaries, its outer edge being the heavier black outer line of four irregular lines of

small linear black markings, concentric with the base of wing and which are only barely discernible on the upper wing surface. Beyond this median band are two very fine marginal silvery lines not very discernible, between which is a row of rather prominent blackish dots or dashes, the three black dots or dashes near the apex of the primaries being more prominent than the others. The inner metallic line is irregular scalloped and broken at the veins, exserted at middle of the wings, and is a little heavier than the outer silvery line, which is close to and parellels the outer edge of the wings. The fringes are very light brown checkered faintly with white. The antenna are black, faintly white at joints, eyes thorax and abdomen are dark brown.

The holotype of *C. mexicana* is a little larger than the type of *C. fulmen* and differs mainly from *C. fulmen* on upper wing surface in that the silvery markings are not nearly as prominent as in *fulmen, c*ausing it to have more of a uniform brown appearance, although the dark brown dots or dashes between the silvery lines are larger and more prominent in *C. mexicana.* The prominence of the silvery marking on the type of *fulmen* is exceptional and does not occur in the other *fulmen* specimens at hand, which look very similar to *C. mexicana.*

The entire lower wing surface of the holotype of *C. mexicana* is of a light uniform reddish brown color and markings of the upper wing surface are repeated, but are more discernible. The outer basal line of broken dark markings is well defined, single, and not shaded inwardly.

Female allotype primary wing expanse 25 mm. forewing 15 mm. (about maximum wing expanse of material at hand, which consists of six specimens, the smallest wing expanse being 21 mm.). The color of the upper wing surface of the allotype is a slightly lighter brown shade of brown than on the holotype, but the median dark band and other markings are similar. The primaries are more rounded than in the male and the apex of primaries is produced or falcate as in the male.

The lower wing surface of the allotype is of a paler, more yellowish color than in the holotype, but the median dark band and other markings are similar.

The female genitalia of *C. mexicana* are distinctive and quite different from those of *C. fulmen* as shown in the figures. Nothing is known of the life history of *C. mexicana.* Its distribution from specimens at hand is as follows: States of Oaxaca, Veracruz, Morelos, Hidalgo, San Luis Potosi, Nayarit Tepic and Sinaloa, in Mexico.

C. mexicana is sometimes found in the same locality as *C. fulmen* in Mexico, especially in the Veracruz area.

The holotype will be deposited in the American Museum and allotype in the U.S. National Museum with paratypes being distributed to Carnegie Museum Zoological Museum of Berlin, Mex. Nat. Mus. and some other Museums with permission of the owners.

No. 9 **Calephelis sixola,** McAlpine, new species

This species belongs to the *fulmen* group.

The male holotype was collected at Sixola River, which is located in the southern end of Costa Rica, in Sept. (no date) and was in the Schaus and Barnes collection in the U.S. National Museum. I know of only one other male specimen labeled Costa Rica, Joicey bequest in the British Museum.

Male holotype, primary wing expanse 24 mm. forewing 13 mm., the same size as the original *C. fulmen* type. The holotype is only slightly smaller than the only other male specimen. The upper surface of the holotype is almost identical with that of the original type of *C. fulmen* being of a light uniform chocolate brown, with a rather prominent dark irregular blackish band across the middle of both primaries and secondaries, its outer edge being the heavier black outer line of about four irregular lines of small linear black markings which are concentric with the base of wings, but are only barely discernible on the upper wing surface. Beyond this median dark band are the two rather fine sub-marginal and marginal silvery lines between which is a row of small black dots or dashes, the three anterior dots larger and more prominent than the others. The submarginal silvery line is irregular, broken at the veins, outwardly exserted at the middle of the primaries, and a little heavier than the other marginal silvery line which parallels the edge of the wing. The outer edge of the primaries is undulated being squared off at the middle, and the tip of wing is slightly produced or falcate. The fringes are light brown faintly checked with white.

The lower surface is rather light reddish brown similar to that of the original *fulmen* type, with lines and markings of the upper surface repeated, but better defined. The outer basal line of broken dark markings is well defined, single, and not shaded inwardly.

The male genitalia of *C. sixola* differs mainly from those of the neotype of *fulmen* in the much shorter length of the transtilla

which extends only just beyond the end of the valvae, and the slightly shorter length of the finger-like processes, with the anterior process not exceeding beyond the end of the valvae, which it does considerably in the neotype of *fulmen.* The shape of the valvae as shown in the figures is somewhat different than in neotype *fulmen.*

Female Allotype, primary wing expanse 28 mm., forewing 14 mm. The allotype is an exceptionally large specimen. There is only one other female specimen in the type series and it has a primary wing expanse of 23 mm. The upper and lower surfaces of the allotype are very similar in color and general markings to the holotype, only somewhat heavier. The primaries are more rounded and tip of wing a little more produced or falcate than in the male holotype. The other female in the series has lighter shades of brown on both wing surfaces but with similar markings. The female specimens are assumed to be the female of *sixola.* The allotype and other female in the series are from Banana River and Juan Vinas respectively, and the holotype is from Sixola River, all localities fairly close together in Costa Rica.

The allotype is labeled Banana River, Costa Rica, Mar. 1907 in collection of Wm. Schaus in U.S. National Museum. The genitalia of the allotype is figured and it appears to agree fairly well with the genitalia of the only other female in the type series but is quite different from type *fulmen.*

It is possible that *C. sixola* may be considered only a sub species or varient of *C. fulmen* but by obtaining more material and doing life history work in the future, its status will be more fully determined.

The holotype and allotype will be deposited in the United States National Museum and paratypes will be deposited in Carnegie and British Museums where the specimens were obtained.

No. 10 **Calephelis costaricicola,** Strand

Calephelis costaricicola was described by Strand in Lepidoptera Niepeltiana in 1916 on pages 19 and 20 and figures on plate 14, figures 20 and 21.

The following is a translation on his description which was published in German.

"A male from Costa Rica is probably near *C. fulmen,* but the forewings are not lighter colored nor more reddish distally; the dark markings on the upper side are not black but dark brown to blackish brown; there is no distinct row of "sublimable" dark dots, while instead of sharply defined dots only indistinctly bordered, more or less confluent scrawls are present; these

are bordered not by two silver, but by lead-colored, weakly shining, narrow, indistinct and irregular lines; the underside is dull reddish-yellow, without any coherent lines whatever, only the outer of the two metallic lines, which may be called silver white here, seems nearly coherent because it is finely interrupted only at the veins. The row of black dots passing nearest the silver line is the plainest and most regular, whereas the dots of the basal half do not form a regular row. The dots between the silver lines are small to the point of vanishing in both wings. The fringe of both wings dark black and dappled gray above and below, no where white. Length of forewing 11 mm. The dark median-band on the upper side of both wings is very distinct and as conspicuous as the sharp and "drawn-out" apices of the forewings, characters which refer the species to the neighborhood of *C. fulmen.* —I have seen a very similar form, determined as *C. australis Edws.*; this, however, differs by having white and here and there black fringe: among other things."

The male specimen of *Calephelis costaricicola* as described by Strand appears to be an extreme varient or a badly worn specimen as the usual markings on both upper and lower wing surfaces are not very discernible.

Every effort was made to locate the type of *C. costaricicola* through European Museums, but to no avail and the type appears to be lost. I have selected a specimen of Calephelis from Monte Rodondo Costa Rica, collected by Cary on March 2, 1902, which is in the Holland collection at Carnegie Museum, as a neotype, as it is the same size as the type and appears quite like the original illustrations and description of *C. costaricicola.* I have also selected a female Calephelis from the same locality in Costa Rica which was also collected by Cary on the same date as the proposed neotype, and which is also in the Holland collection at Carnegie Museum, as the probable female of the species, and have labelled it as such.

Male *C. costaricicola,* neotype, McAlpine, primary wing expanse 22 mm., forewing 11 mm. Coloration upper wing surface, a rather uniform chocolate brown color with the usual black and metallic markings which are not very discernible. The two marginal metallic lines are leaden colored and barely discernible and the black dots between them are also very faint. The mid-dorsal dark band across both wings is narrow, irregular, and also not very prominent. The fringes are brown, with whitish dappling, barely noticeable. The lower wing surface is of a uniform dull reddish yellow with all markings of the upper surface repeated only more distinct. The two marginal metallic lines are silvery. The outer mid-dorsal basal line of black markings is inclined to be doubled or shaded inwardly. The apices of the forewing are somewhat drawn out.

Female *C. costaricicola,* of neotype, McAlpine, primary wing expanse 20 mm., forewing 10 mm. Coloration and markings of

upper wing surface similar to male neotype only that the mid-dorsal dark band is a little more prominent. The coloration and markings of lower wing surface is also quite similar to male neotype only the markings are a little heavier and more prominent and it is assumed to be the female of the species as it was found in the same locality at the same time by the same collector, Cary.

C. costaricicola is practically indistinguishable from *C. argyrodines* superficially, but the genitalia are constantly somewhat different as indicated in the drawings, enough I believe to warrant specific designation. The male genitalia of both *argyrodines* and *costaricicola* look somewhat similar but the female genitalia are more distinctive. I have examined and made genitalia slides of a series of fourteen males and three females of *C. costaricicola* near neotype, from Costa Rica, that are in collections of Carnegie Museum, British Museum, American Museum and U. S. National Museum. I have seen only one specimen, a male Calephelis from Costa Rica that appeared to be nearest to the type of *C. argyrodines.*

I have been somewhat puzzled by a large series of Calephelis collected by E. C. Welling of Merida, Yucatan Mexico, from Quisache and Baleu, Guatemala, consisting of about seventy males and fifty females which appear to be nearest *C. costaricicola* neotype and thirty males and nine females that appear to be nearest *C. argyrodines,* by genitalia examination. In this series the male genitalia seem to vary somewhat and I wondered if there could be hybridization between these species in this area, as the type locality of *C. argyrodines is* Duenas, Guatemala, which is close to Quisache and not far from Baleu. I have made drawings of some of these genitalia variations. Life history work on these species in this area would be very desirable in determining the relationship of these species. It is to be noted that in both species that the fringes of wings are inclined to be somewhat checkered with whitish. The range of *C. costaricicola* neotype is through Costa Rica to and through Guatemala while the center of distribution of *C. argyrodines* appears to be Guatemala, from material at hand.

The neotype of *C. costaricicola* and assumed female, together with genitalia slides of same, will be deposited in the Carnegie Museum and paratypes of same will be deposited in U. S. National Museum, American Museum, British Museum and some others with consent of the owners.

No. 11 **Calephelis perditalis** "Barnes and McDunnough" 1918

Contributions to the Natural History of the Lepidoptera of North America, Vol. 4, No. 2., 75, 76, Plate 12, Figures 5, 6, 7.

Calephelis perditalis is a complex species with primary wing expanse of male paratypes about 21 mm. with forewing 11 mm. and of female paratypes about 22 mm. with forewing 12 mm. The type series consists of six male and six female specimens taken at San Benito, Texas, are deposited in the United States National Museum.

Ground color of upper surface is a uniform rather dull dark reddish brown. All markings on upper wing surface including the usual two silvery marginal and sub marginal lines are not very distinct. On the upper surface are the usual four or five basal concentric lines of irregular black markings, the outer line of which is geminate or doubled in the type species but not always in some other specimens of persumed perditalis. This outer line forms the outer margin of an irregular dark median band or shade across both wings which is sometimes present. This outer basal line of markings is much closer to the inner silvery line than in *C. nemesis.*

The lower surface is of a lighter tawny color and all markings of upper surface are repeated and quite prominent. The inner silvery line of the primaries is heavier and exserted at the middle as in *C. virginiensis* and *C. muticum,* while the outer silver line is straight and finer. The row of black dots between the silvery lines is prominent. The primaries of both male and female are rounded and quite similar, making sexes sometimes difficult to separate. The primaries are not quite so rounded as in *C. virginiensis.* In *C. nemesis* and some other species the primary wing shape of the males is narrower and apex more sharply pointed than in *C. perditalis.* The fringes are light brown and in the primaries are checkered with white at apex, center and inner angle but this checkering is often not very distinct.

Some specimens of *perditalis* are darker and smaller than specimens of the type series and may be seasonal forms and one can only be sure of identity by careful genitalia examination.

There appears to be some considerable rather slight variation in the genitalia of both male and female and especially in the female, so am illustrating some of these varients. In this group I am also showing the genitalia of what appears to be a ♀ aberration of *C. perditalis,* which was collected by Roy O. Kendall in

Cameron Co., Texas, on October 10, 1964. This specimen is a distinct aberration, which is apparently a rare occurance in genus Calephelis. I have seen and examined several thousand specimens of Calephelis but never before seen anything like this one or one that could even be considered slightly abberant, which speaks well for the constancy of this genus. A description of the abberant is as follows: Upper surface, uniform dull brown color with all markings indistinct, but where visible, corresponding with perditalis. There is no visible dark median band or shade across the wings. The lower surface is where the distinct abberation occurs. The lower part of the wing from inner edge of sub marginal silvery line to thorax is pale uniform yellowish color, not tinged with reddish, with most of the basal irregular black markings missing, except the outer line of black markings, which is fairly well defined and single. From inner edge of sub-marginal silvery line to outer edge of marginal silvery line is a blackish band or shade on the primary wings, which extends through the secondaries where it is spotted centrally, with yellowish, of the same color as on basal part of the wings. There is a trace of silver overlaying this blackest band.

The life history of *C. perditalis* has not been completely recorded but Mr. & Mrs. Roy Kendall of San Antonio have reared it on *Eupatorium odoratum* and it is probably several brooded.

The general range of the species is from southeastern Texas through eastern Mexico to approximately Mexico City. I have seen *perditalis* specimens from San Benito, (type locality), Brownsville, Pharr, Laredo, Corpus Christi, Skidmore and Kerrville in Texas. I would also identify as *perditalis,* specimens from Victoria, El Salto, and Tamazunchale, Mexico. In this Revision I am describing a new sub-species called *Calephelis perditalis donahuei* taken near Jacala, State of Hidalgo, just north of Mexico City, as there appears to be some constant differences in genitalia from types, which would justify this. Jacala is about three hundred and seventy-five miles south of the type locality of *perditalis* in Texas. In this paper I am also describing a new species which is evidently closely related to *C. perditalis,* with type locality at San Jose, Purua, State of Michoacan, Mexico, which I am naming *Calephelis matheri.* Intermediate forms between this species and *C. perditalis* are found in adjoining and nearby areas and only life history work will fully determine the status of this species and *perditalis* and their intermediate forms.

In 1961 I contributed the section on Calephelis in Paul R. and Anne H. Ehrlich's Book, "How to know the Butterflies" and

at that time, called *C. perditalis* a sub-species of *C. nilus* (Felder), based on my examination of the male type specimen with genitalia of *C. nilus* in the British Museum in 1952. In 1952 I noted that the genitalia were somewhat damaged, particularly at the end of the transtilla which seemed split and spread. In 1968 I visited the British Museum and re-examined the type specimen of *nilus* which was in fairly good condition, and also the genitalia which were badly damaged, more so than in 1952 when I first examined them. The genitalia were so badly damaged it was impossible to reconstruct an accurate drawing of same. The type specimen of *nilus* looked quite similar to *perditalis* and in the original description of *nilus* by Felder it was called a female, (later on genitalia examination proved it to be a male). Barnes and McDunnough noted that it was difficult to separate the sexes in *C. perditalis,* so in that respect they were quite similar. I noted that there is no doubling of the outer transverse basal line on the lower wing surface of *nilus* type, as there is on the types of *perditalis,* although that doubling I have observed does not always occur in other specimens of persumed *perditalis* from near type locality.

Taking everything into consideration, particularly the badly damaged genitalia of *C. nilus* and the great distance between recorded type localities of *C. nilus* (Venezuela), and *C. perditalis* (Texas), and my records of fairly typical *C. perditalis* which extend south only to about Mexico City in Mexico, I have come to the conclusion that *C. perditalis* is a distinct species and not a sub species of *C. nilus,* which I consider a doubtful species or species inquirenda.

No. 11A **Calephelis perditalis donahuei** McAlpine, new sub-species

Male holotype, expanse of primary wings 21 mm., forewing 11 mm. There is one other male specimen which was made a paratype, having expanse of primary wings 20 mm. These two specimens were taken by J. P. Donahue, 3 miles S.W. of Jacala, Hidalgo, Mexico, Elev. 5800 feet on August 1, 1963. One other male specimen taken by J. P. Donahue at the same locality and on the same date appears to be somewhat different than the two specimens above referred to, and is like *matheri.*

Upper wing surface of holotype is of a rather dark brown color with all markings not very well defined. On close examination the usual four or five concentric basal irregular and broken

lines of black markings are just descernible on lower half of wing, the outer of these lines being somewhat heavier and marking outer edge of a rather narrow median shaded area across both wings, which is not very discernible. The two silvery lines marginal and sub marginal with black dots between are fine and not very discernible. The fringes are pretty well worn but appear to be light brown.

The lower wing surface is of a uniform light ochre or yellowish color with all markings of the upper surface repeated and well defined. The outer basal line is single and not doubled as in type *perditalis*.

Female allotype primary wing expanse 23 mm., forewing 12 mm. It was the only female specimen taken by J. P. Donahue 3 miles S.W. of Jacala, Hidalgo Co., Mexico, on August 1, 1963. Upper wing surface is similar in color to that of the holotype but the usual markings are a little more well defined, although not very discernible. The median slight shaded area just discernible in the holotype is not discernible in the female. The lower surface is of a uniform light ochre or yellowish color with all markings of the upper surface repeated and well defined. The outer basal line is single and not doubled. The fringes are worn but appear to be light brown.

The male genitalia is quite similar to type *perditalis* but does not have a jog at anterior end of transtilla as in type *perditalis*. The posterior end of genital plate of female is somewhat different from female type *perditalis*. Life history work of this sub species is very desirable.

The holotype and allotype will be deposited in the U.S.N.M. by permission of Michigan State University, for whom J. P. Donahue collected them, and paratype will be deposited in Michigan State University.

No. 12 **Calephelis wrighti,** Holland 1930

Annals of the Carnegie Museum 20: 5, 6.

This butterfly is from 19 to 25 mm. in expanse of primary wings, forewing 12 mm. and is outstanding in beauty and trimness. The color of the upper surface is of a rather uniform reddish brown, being lighter in some specimens, and the whole wing surface seems to be overlaid with a faint delicate whitish film. The usual black markings and the two silvery metallic lines are not very discernible on the upper surface and the black spots between the silvery lines are rather small. The fringes on both

fore and hind wings are conspicuously checkered with white. The outer edge of the male primary wing is quite undulated being squared off at the middle and the tip is pointed, while in the female the border of the forewing is more squared off and rounded. As usual the female is larger than the male. The genitalia characters of both male and female are distinctive from other Calephelis as shown in my figures.

The life history has been partially worked out under the name of *Calephelis australis* by the late Dr. John A. Comstock and the late Commander C. M. Dammers in Bulletin of the Southern California Academy of Sciences, Vol. 27, Sept.-Dec. 1928 and its food plant is *Bebbea juncea*. The larva is covered with long white hairs as in *muticum* and *borealis*. It has normally two broods per year, the fall brood, more common according to Lloyd Martin, and is found in the lower desert of southern California. The type specimen is in the California Academy of Sciences. The range of this species is southern California and southwest Arizona, and that part of Mexico immediately bordering these states, including the peninsula of Baja California, Mexico and Puerto Libertad in Sonora, Mexico.

No. 13 **Calephelis muticum** McAlpine 1937

Bulletin of the Brooklyn Entomological Society, 32:43-49, Pl. 1, Figs. 1 to 7.

It has expanse of primary wings of about 25 mm., forewing 13 mm., being a little smaller than *C. borealis* for which it once had been mistaken. The color of the upper surface is of a rich mahogany color while the lower surface is of a light tawny or fulvous, the color being fairly uniform. This species is quite similar in general appearance and markings to *virginiensis* but is larger and the upper surface is of a dark mahogany brown color although worn specimens become more yellowish as in *virginiensis*. There is usually a slightly suffused very narrow dark band or shade across median area of both wings but not so prominent as in *C. borealis*. The two rows of metallic markings on the upper wing surface are silvery and more prominent than in *borealis*. The inner metallic line is irregular and noticeably exserted at the center of forewing as in *virginiensis*. All markings of the upper surface are repeated on the lower surface, but are more prominent due to the lighter ground color. The fringes are light brown with no white checkering. The genitalia characters of the male are good, and the female genital plate is quite similar to that of *C. virginiensis*, as shown in my figures.

The complete life history of *C. muticum* has been worked out by the author and recorded in Bull. Brooklyn Ent. Soc., 33:

111-121 (June 1938). *Calephelis muticum* usually occurs on springy land along small springs adjacent to streams or in openings in tamarack bogs where its food plant the swamp thistle (*Cirsium muticum*) occurs. It is single brooded, the adults usually emerging the latter part of July. The egg is turban shaped and of a delicate coral pink color when first laid. The larva has eight stages and hibernates during the winter, usually in the fourth stage, at the base of its food plant among the small hairy leaves of its food plant. The larva is fringed with long white hairs and has long white hairs projecting upward mid dorsally, as in borealis. The chrysalis is suspended by a silken girdle and is covered evenly with a cocoon like mass of the cast off long hairs and exuviae of the last larval stage. *C. muticum* is a comparative rare species, as its habitat is quite restricted and the flight period very short, being only about a week or two. The type locality is Willis, Washtenaw Co., Michigan. The recorded occurance of this species is Ohio, near Columbus, Southern Michigan in Lower Peninsula south of about Grand Rapids latitude, Illinois near Chicago, Wisconsin near Milwaukee and Missouri near Willard, also from Pennsylvania near Pittsburgh.

The holotype and allotype are deposited in the U. S. National Museum.

I am including in this Revision a copy of the plate showing the early stages of *C. muticum* as published in Bulletin of the Brooklyn Entomological Society in 1938 in my life history of *Calepheles muticum,* as it is quite typical of the few known life histories of Calephelis.

No. 14 **Calephelis rawsoni** McAlpine 1939

Bull. Brooklyn Ent. Soc. 34:75-80, Plate figs. 1 to 9 (1939).

This butterfly is about 25 mm. in expanse of primary wings, forewing 12 mm. The color of the upper surface is a dull reddish brown. In fresh specimens the outer line of the black basal markings near center of both wings is slightly heavier, forming sometimes the outer edge of a narrow suffused dark band across both wings. The other lines and the two marginal and sub marginal silvery metallic lines are hardly discernible on the upper surface while the black spots between the silvery lines are quite prominent. The lower surface is light uniform tawny, with all the markings of the upper surface repeated and well defined. The inner row of metallic markings are much heavier than the outer row and is wavy and exserted at the middle of the primaries much as in *virginiensis* and *muticum.* The outer edge of forewing is slightly undulated and square cut at the center, and the fore-

wing of the male is narrower than that of the female with its apex somewhat pointed, while the forewing of female is larger and more rounded. Fringes of the wings are light brown and on forewing are slightly checkered with white, at apex, center and inner angle but not noticeable on secondaries. The genitalic characters of both male and female are good as shown in my drawings.

The life history of *C. rawsoni* has not been completely recorded, but Roy O. Kendall of San Antonio has reared it on Epatorium havanense and Eupatorium, griggi. It probably has two or three broods, judging from dates of specimens. Its range is Southern Texas, having been recorded from Bexar, Comal, Kendall, Kerr and Travis Counties and to the west in Brewster Co. in Big Bend National Park and one specimen from Lyford in Willacy Co. Texas, most of the recordings being by Roy O. Kendall. The type locality is Kerrville, Kerr Co., Texas and the types are deposited in the U. S. National Museum.

No. 15 **Calephelis freemani** McAlpine, new species

Male holotype wing expanse 22 mm., forewing 12 mm., paratypes, wing expanse 22 mm. to 25 mm. Upper surface of both primaries and secondaries are a dull, rather uniform light brown inclined to reddish, crossed with an irregular and usually indistinct darker brown shade across middle of both wings (this shade being more discernible in some of the paratypes than in the holotype), its outer margin being the more distinct outer line of four or five irregular lines of very small black dashes which are concentric with base of wings, as is usual in most species of Calephelis.

Beyond this outer basal line are the usual two rather fine metallic lines, between which is a row of rather prominent black dots, the outer marginal metallic line being straighter and finer, while the inner metallic line is heavier, irregular and exserted outwardly near the middle of both primaries and secondaries. These metallic lines are leaden in color and barely discernible on the upper wing surface. The fringes are light brown, interspersed with faint whitish checkering, more noticable on the lower surface. The antenna is brown with white at the joints, the club black. The dorsal surface of thorax, abdomen and head is dark brown.

The lower wing surface is of a uniform ochre or tawny color with all the markings of the upper wing surface repeated, but more prominent, due to the light ground color. There is no doubling of the outer basal line of black markings. The metallic mark-

ings are silvery. The ventral surface of thorax, abdomen, legs and head are concolorous with lower wing surface, and eyes are dark brown. The wing shape is similar to that of *C. rawsoni,* rather elongated and slightly undulated at center of primaries, with somewhat pointed tip in male, more rounded and square cut in the female.

The female allotype is very similar in coloration and markings to the male holotype on both upper and lower surfaces, but with median dark band more prominent.

Calephelis freemani resembles *C. rawsoni* rather closely in shape of wings, coloration and markings. The male genitalia of *freemani* differs mainly from *rawsoni* in the length of the posterior end of the transtilla, which in the former extends only to the end of the valvae or a trifle beyond, while in *rawsoni* the transtilla is much longer and more slender and pointed than in *freemani.* It is to be noted that the length and shape of the transtilla together with valvae are important characters in specific determination of Calephelis. The shape of valvae is more constant in *freemani* than in *rawsoni,* where it is very variable. I have seen a male specimen of so-called *rawsoni* from Chisos Mts., Brewster Co., Texas in Big Bend National Park that seems to be between *rawsoni* and *freemani* in length of transtilla but shape of transtilla is more as in *freemani.*

The female anterior genital plate of both *rawsoni* and *freemani* are quite similar although the posterior margin of the anterior genital plate of *freemani* is somewhat flatter and no so angular as in *rawsoni.*

The food plant and life history of *C. freemani* are unknown. I have a series of eighteen specimens of *C. freemani,* many of which are not in very good condition. Ten of these were collected by H. A. Freeman and three by Stallings and Turner in June 1942 and two were collected by H. A. Freeman in August 1951. These fifteen specimens were collected in the same locality in the Davis Mts., Jeff Davis County, Texas, about twelve miles northwest of Alpine, Texas, along State highway 118, near a small stream. I have since collected in this area several times and so has Mr. Freeman, but no more specimens were found. *Calephelis nemesis* is found also in this area.

The three other specimens, two males and one female, of *C. freemani* were obtained from the American Museum. These specimens are a little larger than the average of the other specimens, being 25 mm. to 27 mm. in expanse. They were collected by O. C.

Poling, June 15, 1928, near Ft. Davis, Davis Mts., Jeff Davis County, Texas.

Because of the rather close similarity of both sexes superficially and in genitalia, *C. freemani* may be considered by some as a sub species of *C. rawsoni* but life history work on *C. freemani* in the future can better determine this.

The holotype and allotype will be deposited in the U. S. National Museum and paratypes elsewhere, with permission of the owners.

In 1961 the author contributed the Calephelis section of "How to know the Butterflies" by Paul R. and Ann H. Ehrlich and made an error in determining this new species as *C. argyrodines*. *C. argyrodines* was described from Guatemala and since 1961 I have had an opportunity to more carefully examine the type and genitalia of *C. argyrodines* and find that my new species *C. freemani* is not *C. argyrodines*.

No. 16 **Calephelis arizonensis** McAlpine, new species

In examining specimens of Calephelis in the U. S. National Museum in 1939 shortly after discovery and publication of *Calephelis rawsoni* from Texas, I noticed a number of specimens of a large species from the Baboquivari Mts. Pima County, Arizona, collected by O. C. Poling, mostly in September and October 1923, but with no data regarding exact location in those mountains. Most of these specimens were not in very good condition and were of a rather uniform light brown color, with the two marginal lines of metallic markings on upper wing surface barely discernible. An examination of the male genitalia of some of these specimens proved they did not belong to the nemesis complex group occuring in that area, but were of an unknown species. Later on in 1939 I received a number of specimens which appeared to be the same species, by genitalia examination, from Dr. A. E. Brower collected by Dr. J. W. Tilden in the later part of March 1938 in Brown Canyon, Baboquivari Mts., Pima Co., Arizona. These specimens were as a rule slightly darker brown than the Poling specimens and were more striking in appearance with a dark irregular, ill-defined median band across both primaries and secondaries and with a small whitish sub-apical area on both wings. In 1949 a few more specimens were received from Dr. Tilden from the same locality. Since then additional specimens of the same species, but resembling more the Brown Canyon specimens were received from other collectors, prin-

cipally Killian Roever, Lloyd M. Martin, Dr. John A. Comstock and Dr. Lee D. Miller, which extended its distribution. There were also a few more specimens in the U. S. National Museum, labeled Baboquivari Mts., Pima Co., Arizona, with no further data. All told, there were eighty-five specimens: Forty-five were of the slightly darker and more distinctly marked form dated February and March which I propose naming *Calephelis arizonensis,* McAlpine, new species, with type locality Brown Canyon, Baboquivari Mts., Pima Co., Arizona. The other slightly lighter form above referred to and collected by O. C. Poling in the Baboquivari Mts., Pima Co., Arizona, but without a more defined location appears to be a seasonal form although it may be a sub species of *arizonensis* but life history work is necessary to fully determine this.

Other localities in addition to the Baboquivari Mts. where a few specimens of *Calephelis arizonensis* have been taken are Sabino Canyon, Santa Catilina Mts., Pima Co., Arizona; Reddington, Pima Co., Ariz.; Madera Canyon, San Rita Mts., Santa Cruz Co., Ariz.; Patagonia Mts., Santa Cruz Co., Ariz.; and Payson, Gila Co., Arizona. All of these specimens were taken in the early part of the year and were near type *Calephelis arizonensis* in appearance.

Male holotype: Primary wing expanse 27 mm., forewing 14 mm. The wing expanse for forty-four other specimens examined ranged from 25 mm. to 27 mm. Upper Surface: Head top medium brown, concolorous with upper wing surface, eyes lighter brown, antenna dark brown with white rings at joints and club black. Dorsal surface of thorax and abdomen dark brown. Basic color of upper surface is rather light brown near to cinnamon brown (Plate 15 Ridgeway colors). On the basal half of both primaries and secondaries there is a series of small blackish linear transverse lines, broken at the veins, more or less concentric with base of wings. The outer of these transverse lines forms the outer margin of a more or less ill-defined but conspicuous irregular dark brown rather narrow band or shade across the middle of both wings. In addition to this dark median band or shade a usually prominent marking of this species is the presence of a small irregular whitish patch located in subapical area of both wings. In some specimens these patches are not so conspicuous but form part of a lighter brown area lying between the dark irregular median band or shade and row of small dark brown or blackish spots which lie between the two marginal metallic lines.

There are two marginal metallic lines across both wings which are leaden or coppery in color, the inner line being heavier and made up of irregular linear markings broken at the veins. The inner line of irregular metallic markings is exserted outwardly near the middle of the wings, while the outer line forms a fine continuous line close to the edge of wing. As already noted, between these metallic lines is a row of very small dark brown or blackish spots. Both the metallic lines and small dark spots are barely discernible on upper surface in the holotype and most of the paratypes. The ground color of the basal half of upper wing surface is of a dark brown shade, while the sub-marginal or limbal area is lighter. The fringe is pale brown, faintly checkered with white at apex, inner angle, and middle of forewing and also faintly checkered with whitish in secondaries, but the checkering varies considerably in some specimens being more prominent than in others. The outer edge of forewing of the male is slightly undulated, the tip being squared off and pointed.

The lower wing surface, including legs, thorax and abdomen is of a uniform ochre color and the dark median shade and the contrast in brown and whitish colors of the upper wing surface is entirely lacking.

On the lower surface the markings of the upper surface are repeated and well-defined due to the lighter uniform ground color. The two metallic marginal lines are silvery in color and quite prominent, the inner line is particularly heavy and exserted at the middle, while the outer marginal line is fine and straight. There are three very fine, small and barely discernible metallic lineal spots along the costal wing margin near the inner metallic line. The small dark spots between the two marginal metallic lines are usually small and faint in most specimens.

Female allotype: Primary wing expanse 27 mm., forewing 14 mm. (about average for nine other specimens examined). It is similar to the male in general markings and coloration on both surfaces. The whitish checkering of the fringes is usually more noticeable in the female. The forewings of the female are not so pointed as in the male but are more rounded and becoming square cut at the apex.

The new species *C. arizonensis* was mistakenly figured as *C. nemesis* in Holland's Butterfly Book, 1898 Edition, Plate 28, Fig. 14. Holland identifies this figure as *Calephelis nemesis*. I have carefully examined the specimen from which this photo was made (in the Edwards collection at Carnegie Museum) and have made a genitalia slide of it and find that it is *C. arizonensis* and not *C. nemesis* or *australis*.

In Holland's 1931 edition this same specimen of *C. arizonensis* is shown on Plate 8, Figure 14 as *C. australis*. Although the size is the same and the markings and coloration of the upper wing surface in this specimen are not quite so well defined as in type *C. arizonensis*, still they are fairly discernible and identifiable as *C. arizonensis*. There may be hybrids between *C. arizonensis* and *C. nemesis*, as I have seen some specimens that appear to be that, both superficially and in their genitalia.

The holotype and allotype of *C. arizonensis* will be deposited in the U. S. National Museum with permission of Dr. J. W. Tilden, original collector and owner, and paratypes of same will be deposited in Los Angeles County Museum, Carnegie Museum, American Museum and in some private collections with permission of the owners. Genitalia slides or preparations if made, will be deposited with the specimens.

No. 17 **Calephelis sinaloensis**, McAlpine, new species

Male holotype primary wing expanse 20 mm., forewing 12 mm., (about average for the seventeen male specimens examined, although three of these specimens were about 23 mm. in wing expanse). The holotype and a number of the other male specimens in this series were taken on Nov. 1, 1961, 17 miles east of Concordia, Sinaloa, Mexico, by the Cary-Carnegie Expedition.

The upper wing surface of holotype is of a uniform dull rather dark chocolate brown color with all markings rather subdued. The usual four or five concentric rows of small black broken markings are present on the basal half of the wings, but are not easily discernible. The outer of these basal lines is somewhat heavier than the others and slightly shaded inwardly forming a slight narrow and irregular not very distinct dark band across both wings, varying considerably in the specimens at hand. Beyond this outer basal line or band are the usual two fine silvery lines, submarginal and marginal, between which is a row of small black dots. The fringes are pale brown whitish or checkered with white. Antenna and club blackish with white checkering at joints. Thorax and abdomen blackish.

The lower surface is a uniform ochre or yellowish slightly reddish brown with all markings of the upper wing surface repeated but more clearly defined because of lighter ground color. The outer basal black irregular line is mostly single but inclined to be doubled in the holotype. The two silvery lines and black dots between are well defined. The submarginal silvery line of

broken spots is not so exserted at the center of wings as in some other species of Calephelis.

Female allotype, primary wing expanse 20 mm., forewing 12 mm., (about average for seven specimens in the series examined). The shape of the primary wings of the female are decidedly rounded while in the male it is more slender and the apex more pointed. The color and markings of the upper wing surface are quite similar to the holotype but the markings are somewhat heavier and the outer basal line of black markings, together with some dark shading, is a little better defined than in the male. The lower wing surface is the same color as in the male and all lines and markings are quite heavy and well defined. The outer basal broken line is single in the allotype but in some other specimens in the series it is somewhat doubled. The female allotype and others in the series were taken at Mazatlan, Sinola, Mexico on Oct. 28, 1961. Nothing is known of the life history of this species. *C. menesis* was found in company with it. The genitalia of both male and female are quite distinctive as indicated in the drawings. The genitalia of both male and female of *C. sinaloensis* is quite similar to genitalia of *C. arizonensis* the only other species it might be confused with. *Calephelis arizonensis* is a much larger butterfly usually with lighter shades of brown on both surfaces than in *C. sinaloensis*. The black markings are heavier on *sinaloensis* although the median shaded area on the upper surface is better defined in *arizonensis*. The upper wing surface of *C. sinaloensis* lacks the striking small whitish subapical area on both wings present in typical *arizonensis*.

The distribution as indicated by specimens at hand in the series is central Sinaloa, Mexico, near Mazatlan and Concordia.

The holotype and allotype will be deposited in the Carnegie Museum and paratypes in U.S.N.M. and some other museums with permission of owners, together with genitalia preparations of same.

No. 17A **Calephelis sinaloensis nuevoleon,** McAlpine, new sub-species

Male holotype, primary wing expanse 25 mm., forewing 12 mm. There was one other male a paratype of same size. The holotype is a fresh specimen taken at Iturbide, Nuevo Leon, Mexico on Aug. 16, 1965, by W. S. McAlpine. The male paratype was taken on Aug. 13, 1947, at Nombre de Dios, Durango, Mexico, Elev. 5900 ft. by W. Gertsch and M. Cazier for the American Museum.

The upper wing surface of holotype is of a uniform slightly reddish dark brown color with the usual four or five concentric rows of small black broken markings present on basal half of the wings. There is a trace barely discernible of a narrow median dark shade across both wings just inside the outer basal line of black markings.

The usual two silvery fine lines, submarginal and marginal are present and well defined, being rather prominent, and the small black dots between the silvery lines are well defined. The fringes are light brown, slightly checkered with whitish. The antenna are blackish with white checkering at the joints, and yellowish at tip of club. Thorax and abdomen dark brown.

The lower wing surface is of a uniform ochre or yellowish slightly reddish brown color, with all markings of the upper wing surface repeated and clearly defined. The outer basal line of black markings is single. The two silvery lines and black dots between are well defined and prominent.

The other male specimen, which was made a paratype is a rather wore specimen, slightly lighter in color on both surfaces but with markings very similar to the holotype, only not so prominent on the upper wing surface, and with genitalia identical with holotype.

The female with genitalia figured, was taken in the State of Durango, the same State where the above paratype was taken and is assumed to be probable female of this species. This female, has primary wing expanse of 22 mm., forewing 11 mm. It was the only female taken and agrees well with general markings of the holotype only these markings are not so prominent on the upper wing surface. The fringes are light brown and well checkered with white.

This sub-species appears rather closely related to both *C. arizonesis* and *C. sinaloensis,* but seems closest to *C. sinaloensis,* so have designated it as a sub species of *C. sinaloensis.* It is to be noted that in the male genitalia of both *C. sinaloensis* and its sub species *nuevoleon* the end of the transtilla is nearer the end of the valvae than in *C. arizonensis* and that the bristles or armature at end of valvae extend further down on the inside of valvae in *C. sinaloensis* and its sub species than in *C. arizonensis* and that end of valvae is more square cut in *C. arizonensis.*

Life history work is desirable in these two species and the sub species to determine their relationship. The range of this sub species, as determined by the two male specimens in the series, is State of Nuevo Leon and Durango, Mexico, which adjoins State of Sonora.

The holotype will be deposited in the U. S. National Museum and the male paratype and female from Durango will be deposited in the American Museum.

No. 18 **Calephelis dreisbachi** McAlpine, new species

Male holotype primary wing expanse 23 mm. The series included six male specimens which ranged from 20 mm. to 23 mm. in primary wing expanse. The holotype and four male specimens of the series obtained from R. J. Jae, were collected by the R. R. Dreisbach of Midland, Michigan, at San Blas, Sinaloa, Mexico, on Sept. 13, 1957. One other male, also obtained from R. J. Jae and similar to the holotype was taken July 3, 1956 by R. R. Dreisbach at San Blas, Mexico, no state mentioned.

Two other male Calephelis specimens in my possession were taken July 7, 1963 by J. P. Donahue, then of Michigan State University, at about four miles east of San Blas, Nayarit. These specimens were evidently a summer form which varied a little from the other male specimens of *C. driesbachi* in having the markings on the upper wing surface heavier and more clearly defined. San Blas, Nayarit is about 400 miles south of San Blas, Sinaloa, Mexico, type locality of *C. dreisbachi.* There is some doubt as to whether these two specimens are *C. dreisbachi* or *C. montezuma* as males of these two species look quite alike and no females were taken at the time to clarify identification as the females of these species are entirely different.

Upper surface of holotype is uniform rather dark reddish brown with all markings not very well defined and somewhat rubbed. The usual four or five concentric basal irregular and broken lines of black markings are discernible, the outer of these lines being slightly heavier with a shaded area, near upper primaries. This small shaded area is not noticeable in the other male specimens and is not present in the summer form. Beyond the outer median black basal line are two rather fine silvery lines with a row of small black dots between. The sub marginal or inner silvery line is somewhat irregular and broken at the veins while the marginal silvery line is straighter and parallels the outer edge of wing. The fringes of the holotype and the other male specimens are worn but appear to be light brown with white checkering. The lower wing surface is uniform ochre light yellowish brown, with all markings of the upper wing surface repeated and well defined. The outer basal line of black markings is single and not doubled.

Female allotype primary wing expanse 23 mm. This a rather badly battered and worn specimen obtained from R. J. Jae and collected by R. R. Dreisbach at San Blas, Sinaloa, Mexico on Sept. 13, 1957, same date and place as the holotype. One other female was collected by Killian Roever on July 19, 1961 along Route 93 six miles north of Nogales, Santa Cruz Co., Arizona. This is a very good specimen and is made a paratype as most markings and the genitalia are similar to the allotype. In the allotype, the shape of the primaries are more square cut or rounded than in the male, where they are narrower and more pointed at the apex. The upper surface is a rather dark shade of brown badly worn off, but the assumed paratype is much fresher. On the upper surface are traces of a dark shade or band across both wings, this being more evident in the paratype. There are the usual two metallic lines, sub-marginal and marginal, leaden in color, with a row of small black dots between, but all are barely discernible.

The lower wing surface of allotype is uniform ochre color, slightly lighter and more yellowish than in the holotype. All markings of the upper surface are repeated and fairly well defined and there is no doubling of the outer basal line of black markings although there is doubling of this line in places on the assumed ♀ paratype taken at Nogales. The sub-marginal silvery line is much heavier in the primaries than the marginal line. The fringes are worn off in the allotype but are light brown checkered with white in the assumed paratype taken at Nogales.

The genitalia of allotype and of assumed female paratype, taken at Nogales are similar, and are distinct from other Calephelis genitalia.

Due to lateness in getting the complete Revision to the printer, the photo of the allotype of *C. dreisbachi is* shown at end of photos for genus.

The male genitalia of *C. dreisbachi* is quite similar to male genitalia of *C. montezuma* but the transtilla is longer and more curved at the end in *C. montezuma,* and careful comparisons show other differences.

No other specimens of *C. dreisbachi,* except the one female taken by Roever, have been collected at Nogales, Arizona, although some collecting has been done there since 1961. I have seen no other specimens of *C. dreisbachi* taken in Mexico between Nogales, Arizona and San Blas, Sinaloa, Mexico, a distance of about 400 miles, so it is possible that the assumed ♀ paratype specimen taken by Killian Roever in 1961 was accidently trans-

ported to Nogales which is the main entry and exit port between Western Mexico and the United States.

The holotype and allotype will be deposited in the U.S. National Museum and paratypes elsewhere, with permission of R. J. Jae and Killian Roever.

No. 19 **Calephelis stallingsi** McAlpine, new species

Mr. Don Stallings and Dr. Turner of Caldwell, Kansas, have been very generous and cooperative in supplying Calephelis material, especially from Mexico. In the course of examination of this material a little species, somewhat similar to *C. perditalis* or *C. virginiensis* in general appearance and size was uncovered which apparently represents an undescribed species. There are several broods of this species during the year and the upper surfaces of the summer forms are rather dark dull reddish brown with white checkered fringes and fine silvery metallic lines, while the upper surfaces of the winter forms are rather drab brownish with a narrower irregular dark brown transverse band or shade across the middle of both wings, with fringes that are not so noticeably checkered as in the summer forms, and with fine hardly discernible lead colored metallic lines. The author proposes the name *Calephelis stallingsi* for this species. The following descriptions are of the holotype and allotype which represent the summer form.

Male holotype was taken at Valles, San Luis Potosi, Mexico, on May 31, 1951 by Stallings and Turner. Expanse of primary wings 22.0 m.m., forewing 12 m.m. Average expanse of primary wings of 17 paratypes 20.8 m.m. Largest 23.0 m.m., smallest 18.0 m.m.

Upper surface: head — eyes, dark brown, front and palpi tawny yellowish, antennae black with white rings at joints, club black. Thorax and abdomen dark brown approaching black.

Upper surface dull rather dark reddish brown, the area between and adjoining the two outer fine silvery metallic lines reddish brown. On the basal half of both wings there is a series of dark brown or blackish linear markings not well defined which are convex to base of wings and which form four or five indistinct and irregular transverse lines across the wings more or less concentric with base, the outer or median transverse line being a little heavier than the rest. Beyond this outer transverse line are two very fine silvery metallic lines between which is a row of small black dots. The outer

metallic line is rather fine, continuous, close to and equidistant from the edge of the wing, while the inner-metallic is heavier, irregular, broken at the veins, and considerably exserted outwardly at the middle of both wings. The fringe is pale brown uniformly checkered with white and pale brown on both wings, some of the paratypes being more distinctly checkered than the holotype. As can be noticed in the wing venation drawing, the outer edge of the forewing is somewhat undulated, being rather square cut at center, with top being pointed and very slightly falcate.

Lower surface: The legs and lower surface of wings, thorax and abdomen are of a fairly uniform pale fulvous color, although the basal part of wings and legs, thorax and abdomen are paler. The basal black markings which correspond to the transverse lines of the upper surface are rather fine, the outer line being slightly heavier. The silvery lines of the upper surface are repeated, but somewhat heavier, the inner line being heavier than the outer and edged with a few dark scales. The inner silver line of the forewing is exserted outwardly near the middle, but not quite so much as in *virginiensis*. There are a couple of very fine metallic silver specks along the costa preceding the inner metallic line. The black dots between the two metallic lines are repeated on the underside. All of the markings of the lower wing surface are more distinct and prominent than on the upper wing surface. There is a tendency for doubling of the outer or median transverse line on basal half of wings.

Female allotype was taken at Tamazunchale, San Luis Potosi, Mexico, on June 7, 1951, by Stallings and Turner. Expanse of primary wings 22.0 m.m., forewing 12 m.m. Average expanse of primary wings of four paratypes 21.6 m.m. The upper surface is more uniform lighter reddish brown with more definite and heavier markings than in the male. The fringes are light brown, with prominent white checkering on both primary and secondary wings. The outer edge of wing primaries is more square cut and not so pointed as in the males as is usually the case in Calephelis. The lower surface is similar in color to the males with metallic markings and black dots between, somewhat heavier and more prominent. The outer or median transverse line on basal half of wings is single.

Among the specimens of typical *C. stallingsi* that Stallings and Turner collected were thirteen specimens from Valles, San Luis Potosi, Mexico. Eleven were males and two females, and two specimens from Tamazunchale, San Luis Potosi, one male

and one female. They also collected three males at Huichihuayan, San Luis Potosi, and two other males and one female, poor specimens, from the same locality.

Stallings and Turner also collected ten specimens of the winter form of *C. stallingsi* at Victoria, Tamaulipas State, 3 at Valles, 1 at Cd. Mante, San Luis Potosi State, and 1 near Mexico City. Two other badly worn males were from Cd. Mante and one badly worn female from Valles were also collected by Stallings and Turner. The paratype series as a whole are not very perfect specimens.

C. stallingsi seems to resemble forms of *C. perditalis* and *C. virginiensis*. The summer and winter forms of *C. perditalis* and *C. stallingsi* seem to resemble each other quite closely in color and markings and are about the same size, except that the fringes are decidedly checkered in *C. stallingsi* while little or no checkering is present in *C. perditalis*. The winter forms of both species are quite similar with very little checkering of the fringes in *stallingsi* and none in *perditalis*. On the lower wing surface the outer transverse basal line of *perditalis* is usually inclined to be doubled while this is not usually so in *C. stallingsi*, although the holotype and some of the paratypes of *Calephelis stallingsi* winter form have tendency for doubling of this line as in *C. perditalis*.

The primary wings of male of *stallingsi* are inclined to be more pointed than in male *perditalis* and the edge of the wing is more undulated in *stallingsi*. The upper wing surface of *C. virginiensis* is more of a lighter and brighter uniform reddish brown color than in *C. stallingsi*. It is easy to mistake specimens of this species for some forms of *C. perditalis* or other closely related Calephelis so it becomes necessary to examine the genitalia, to be certain of identification. The male genitalia of *C. stallingsi* are very distinct and easily separated from other species of the genus by the large extended and angulated transtilla, and small rather pointed ends of the valvae with little armature. The female genitalia of *C. stallingsi* are also quite distinct as indicated in the drawings of the genital plate.

The range of *C. stallingsi* from specimens at hand, appears to be eastern Mexico, along the gulf coast, from Victoria south into British Honduras and Guatemala.

In addition to Mr. Don Stallings and Dr. Turner the author is indebted to Mr. S. C. Thompson of San Antonio, Dr. G. W.

Rawson, E. C. Welling, the late R. R. Dreisbach and R. J. Jae for specimens, and to Dr. J. F. Gates Clarke and William Field of the U.S. National Museum for aid in identification and loan of specimens.

Specimens of *Calephelis stallingsi* have also been received from Dr. G. W. Rawson, from Tamazuanchal, San Luis Potosi; from E. C. Welling, from Tepescuintle, Tabasco State, Mexico, and X Can Quintana Roo and Piste Yucatan, Mexico, and also one specimen from British Honduras and two specimens from Guatemala. Also received one specimen from Guatemala from the British Museum. Also received from U.S. National Museum one specimen from Cordoba, Veracruz, and one specimen from Tuxtepec, Oaxaca, Mexico; one specimen from R. R. Dreisbach from Puente National, Veracruz, Mexico and one specimen from R. J. Jae (M. Spellman Coll.) from Catemaco, Veracruz, Mexico. *C. stallingsi* appears to have quite an extensive range from northern Mexico southerly to Honduras in Central America.

In addition to the type series of 34 specimens, there were 38 other specimens obtained from various localities previously referred to, but some of these specimens were not in very good condition. Paratypes have been made of the better specimens and they will be returned to those from whom they were received. The male holotype and female allotype will be deposited in the U.S. National Museum and paratypes will be distributed to other museums and collectors with consent of the owners.

No. 20 **Calephelis matheri** McAlpine, new species

Male holotype, expanse of primary wings 20 mm., forewing 12 mm., which was average of four male specimens in the series all of which were examined and genitalia slides made. Three of these specimens including the holotype were taken on Nov. 25, 1965 and the other one was taken Dec. 1, 1965 at San Jose Purua, Michoacan, Mexico, by Bryant Mather and sent to me for study and identification by Harry Clench of Carnegie Museum. Upper surface is of a rather uniform rather dark brown with all markings not very discernible. The usual four or five concentric lines of small black broken markings are present on the basal half of the wings but are barely discernible on the upper surface but can be seen on the lower surface. The outer of these lines is doubled on the holotype and slightly shaded inwardly to form a rather faint and narrow irregular

dark median shade across both wings. In the other three male specimens this outer basal line is perhaps only inclined to be doubled and is slightly shaded inwardly. Beyond this outer basal line are the usual two fine silvery lines, submarginal and marginal, only barely discernible, between which is a row of black spots which is fairly well-defined. As susual the submarginal silvery line is heavier than the marginal one, is irregular, and broken at the veins, and somewhat exserted at the middle of the wings, while the marginal silvery line is straight, not broken, and parallels the edge of the wings. The fringes are light brown checkered with whitish. The antenna are blackish, checked with white at the joints and yellowish at tip of club.

The lower surface is uniform ochre or light yellowish brown with all markings of the upper wing surface repeated but much more distinct and well defined. The doubling of the outer basal line of dark markings is well defined in the holotype.

Female allotype, expanse of primary wings is 20 mm. It was taken with the holotype on Nov. 25, 1965 at San Jose Purua, Michoacan, Mexico, by Bryant Mather. There were three other female specimens in the series taken by Mather in the same locality on the same date, which average the same size in wing expanse and all looked similar superficially and with very similar genitalia. The shape of the primary wings of the female are more rounded and square cut than in the male, where they are narrower and more pointed at the apex. The color and markings of both wing surfaces are similar to the holotype. The doubling of the outer basal line is not so well defined in the female allotype, although the tendency for doubing is present and does occur partially.

The male genitalia of *C. matheri* are quite constant but might be confused with *C. perditalis*. The transilla in *C. matheri* is slimmer than in *C. perditalis* and its end extends constantly almost to the end of the valvae, while in *C. perditalis* the transtilla is broader at its base and is constantly much shorter than in *C. matheri*. The female genitalia of *C. matheri* is quite distinctive in type locality, but varies considerably in other localities as shown in the figures. The female genitalia of *C. perditalis* is also quite variable as shown in the figures. The probable range of *C. matheri* is through central Mexico in States of Michoacan, Guerrero, Jalisco, Zacatecas and adjoining areas.

Nothing is known of the life history of *C. matheri* and the females as shown are assumed to be correct because of similarity to the male and being collected on the same date and in the same locality as the males.

The holotype and allotype will be deposited in the Carnegie Museum together with genitalia slides of same. Paratypes will be deposited in U.S.N.M. and other museums and private collections by direction of the owners.

No. 21 **Calephelis huasteca** McAlpine, new species

The basis for this species is a series of three female specimens taken at or near Tamazanchale, San Luis Potosi, Mexico by three different collectors during the summer season. These specimens appear to be alike both superficially and in genitalia and are somewhat different from other known species. It has been difficult to definitely determine the male of this species but two male specimens collected at Tamazunchale by H. A. Freeman, about one year later at the same locality where the above females were taken could be of this species. The three female specimens above referred to were not very good specimens, one collected June 6, 1941 by Stallings and Turner was considerably worn with lighter brown color on upper surface with expanse of primary wings 20 mm., second of the specimens was collected by H. A. Freeman on July 18, 1963 was also a badly worn specimen with a lighter brown color on upper wing surface, with expanse of primary wings about 20 mm., the third specimen was collected by J. P. Donahue on August 3, 1963 with wings considerably mutilated but being a fresher specimen with blackish brown color on upper wing surface.

The two male specimens, collected by H. A. Freeman which could be the male of this species are fresher and darker in color and quite similar to the third female specimen in coloration. These two male specimens were both collected on June 19, 1964 at Tamazunchale, at the same locality as the females were collected, only about a year later, one specimen had expanse of primary wings of 20 mm. and the other one 22 mm.

Female allotype. The female allotype was selected as the specimen collected by H. A. Freeman on July 18, 1963 at Tamazunchale, Mexico with primary wing expanse of 18 mm., forewing 10. mm.

As before stated it is a rather worn specimen. The upper surface is uniform light chocolate brown with the usual mark-

ings present but only barely discernible. There are traces of a narrow and irregular median dark band located at the usual outer basal line of dark markings. The lower wing surface is pale yellowish ochre with all the markings of the upper wing surface repeated, but well defined. The outer basal line of black markings is decidedly doubled and the two usual silvery lines are present, between which is a row of rather small dark spots. The fringes are worn off, but in the other two female specimens they are light brown checkered with white. Figures of the genitalia of the allotype and one of the other females are shown and appear to be nearer to *azteca* than to any of the other species. Superficially both *huasteca* and *azteca* are quite similar but *azteca* appears to be a somewhat larger species.

Male holotype. The two male specimens collected by H. A. Freeman are assumed to be the male of the females, which they resemble superficially both in markings and in size. The specimen selected as holotype has primary wing expanse of 20 mm., forewing 11 mm. The upper wing surface of the holotype is of a rather uniform dark blackish chocolate color with the usual black basal markings and the two fine silvery lines, between which is a row of black dots, none of which are very distinct. There are traces of a narrow and irregular median dark band along the outer basal line of dark markings as in the female specimens. The fringes are brown checkered with white and the antennae are black with white at the joints.

The lower surface is rather light reddish ochre with all the usual markings of the upper wing surface repeated and well defined. The outer basal line of black markings is decidedly doubled as in the female.

Figures of the genitalia of the holotype and the other male specimen are shown and appear to be alike and somewhat different from others. The shape of the valvae and shorter length of the transtilla, and shape of the aedeagus are somewhat different from those of *C. azteca.*

The allotype and holotype will be deposited in the U.S. National Museum with consent of the original collectors.

No. 22 **Calephelis montezuma** McAlpine, new species

Male holotype, expanse of primary wings 21 mm., forewing 11 mm. which was close to average of thirty male specimens examined. The holotype with a number of other specimens of this species were taken by me on September 23, 1966 at Ciudad

Valles, and Tamazunchale, San Luis Potosi, Mexico. The upper surface of holotype is uniform chocolate brown with all markings indistinct. The usual four or five concentric rows of small black broken markings are present on the basal half of the wings, but are only discernible on close examination, the outer of these basal lines being somewhat heavier and shaded to form an indistinct and narrow irregular dark band across both wings. Beyond this band are the usual two very fine silvery lines, submarginal and marginal between which is a row of black spots, which are more discernible. The submarginal or inner silvery line is slightly heavier and irregular and broken at the veins and somewhat exserted outwardly at the center of the wings but not so much as in *C. virginiensis* and some others, while the marginal or outer silvery line is fine, fairly straight and paralleling the edge of the wing. The fringes are concolorous with the upper surface and are checkered with white. The antennae with club are blackish with white checking at the joints, and the head, thorax and abdomen are concolorous with the upper wing surface. The lower wing surface of the holotype is uniform light ochre or reddish brown with all markings of the upper wing surface repeated, but much more distinct and better defined. The outer basal line of black markings is single and not shaded. Some of the specimens in the series are somewhat darker or blackish shade of brown on the upper surface.

Female allotype, expanse of primary wings 20 mm., forewing 11 mm. is a small specimen, as the average size of the fourteen female specimens examined is about 22 mm. The shape of the primary wings are more rounded and square cut than in the male, where they are narrower and more pointed at the apex. The color and markings are the same as in the holotype, except that all the markings are heavier and more discernible. The white checkering and silvery lines are fairly well defined on the female. The submarginal silvery line is very much heavier on the lower surface of the female, than in the male. The female allotype was taken by me at Ciudad Valles, San Luis Potosi, Mexico on September 22, 1966 in copula with the holotype.

The genitalia of both male and female are distinctive from other species of Calephelis as shown in the figures. Some figures of genitalia somewhat similar to holotype and allotype are shown of other specimens from the same locality.

The male genitalia looks somewhat like those of *azteca* but the valvae are shorter and the transtilla is longer, and more

curved at its end in *montezuma* but the female genitalia of these two species are entirely different. The male genitalia of *C. montezuma* also looks somewhat like *C. dreisbachi,* but the female genitalia of these two species is entirely different. *Calephelis montezuma* flies in company with several other species of Calephelis. This makes identification difficult, as they all look much alike in a general way, and only careful genitalic examination can determine the species. Nothing is known of the life history of *C. montezuma.*

As indicated by specimens at hand this species appears to range in Mexico from Ciudad Valles and Tamazunchale, San Luis Potosi, west possibly to San Blas, Nayarit, and south to Fortin de Las Flores and Acayucan in Vera Cruz.

The holotype and allotype with some paratypes will be deposited in the U.S. National Museum and other paratypes will be distributed to Mexican National Museum, Carnegie Museum, American Museum, Los Angeles Museum and British Museum and some others, as well as to some collectors, with consent of the owners.

No. 23 **Calephelis acapulcoensis** McAlpine, new species

Male holotype primary wing expanse 24 mm., forewing 12 mm. There were seven male specimens in the series, and genitalia slides have been made of the abdomens of all. They vary in wing expanse from 20 mm. to 24 mm., most being about 24 mm. The male holotype and the complete male and female series was taken at Acapulco, Guerrero, Mexico, on June 4, 1962, on low vegetation on edge of jungle growth at altitude of 23 ft. by Dr. G. W. Rawson.

The upper surface of the holotype is rather uniform dark brown, inclined to be blackish on basal half of the wings due to the usual four or five concentric rows or lines of black broken markings. The outer of these basal lines is shaded slightly inwardly to form a not very discernible median shade across both wings. Beyond this median shade the basic color of wing is of a slightly lighter reddish brown. In this area are the usual two fine silvery lines, submarginal and marginal between which is a row of small black dots. All markings on the upper wing surface are indistinct, the silvery lines being more noticeable. The inner or submarginal silvery line is irregular, broken at the veins and exserted at the center of the wing, while the marginal silvery line is straight, not broken,

and parallels the edge of the wing. The fringes are light brown, and whitish, being checkered with white. The antenna are blackish with white at the joints and yellowish at tip of club.

The lower surface is of a uniform light reddish brown, somewhat darker in color than *C. matheri.* All markings of the upper surface are repeated and well defined except that in the submarginal line of silvery spots in the primaries in some places, these spots are small and very faint. The outer basal line of black broken spots is single and not shaded in the holotype but is doubled in one of the males in the series.

Female allotype primary wing expanse 24 mm., forewing 12 mm. Only one other female was taken, wing expanse 21 mm. Both specimens are badly worn but markings are fairly well defined. Both female specimens were taken at Acapulco, State of Guerrero, Mexico on June 4, 1962 by Dr. G. W. Rawson on the same date and in same locality where the holotype and other male specimens in the series were taken. The basic color of the upper surface of the allotype is uniform rather light reddish brown, lighter than in the holotype but some of this lightness in color is probably due to wear. The shape of the primaries of allotype are more rounded and square cut at the apex than in the male, where it is narrower and more pointed at the apex. The markings on both wing surfaces are similar to the holotype but heavier. These markings are more discernible on the upper surface ofthe female than in the male due to the lighter ground color. There is no median shade across the wings on the upper wing surface of the allotype.

The lower surface of the allotype is of a lighter more yellowish brown than in the holotype and all markings are well defined except where worn off. The outer basal line of black spots is well defined and single. The fringes are worn off on the allotype, but the antennae are same as in the holotype. Nothing is known of the life history of this species.

The male genitalia of *C. acapulcoensis* are somewhat similar to those of *C. yucatana* and *C. matheri* but the female genitalia of all three are different from each other as indicated in the drawings. The holotype and allotype together with genitalia slides will be deposited in the U.S. National Museum and some paratypes elsewhere with consent of Dr. Rawson.

No. 24 **Calephelis azteca** McAlpine, new species

Male holotype expanse of primary wings 21 mm., forewing

12 mm., which is about average for twenty-eight male specimens examined. The holotype was taken on May 21, 1965 at Fortin de los Flores, State of Vera Cruz, Mexico, by Dr. G. W. Rawson.

The upper surface is uniform blackish brown, quite similar in color to *C. montezuma,* and the butterfly as a whole resembles *montezuma.* Most of the other male specimens in the series of *C. azteca* are a little lighter brown shade of color than the holotype. The usual four concentric irregular lines of small black markings broken at the veins, are present on the basal half of the wings, but are barely discernible. The outer of these basal lines is somewhat heavier and shaded inwardly to form an indistinct and irregular rather narrow black band or shade across both wings. Beyond this band are the usual two indistinct very fine silvery lines, submarginal and marginal, between which is a row of small black spots. The submarginal or inner silvery line is slightly heavier and irregular and broken at the veins, and somewhat exserted outwardly, at the center of the wings. The marginal or outer silvery line is finer than the submarginal silvery line and is fairly straight paralleling the edge of the wings. The fringes are brown checkered with white. The antennae are blackish with faint white checkering at the joints. Head, thorax and abdomen are blackish.

The lower surface is uniform ochre or reddish, yellow light brown color with all markings of the upper wing surface repeated, but more distinct. The outer basal line of black spots is not shaded, but is doubled or inclined to be so, and differs in this respect from *C. montezuma,* where it is single. The submarginal or inner silvery line of markings in male *C. azteca* is heavier than in the male *C. montezuma.*

Female allotype, expanse of primary wings 23 mm., forewing 12 mm., which is about average for the eight females that are in the series of specimens. The series of both male and female is composed mostly of imperfect specimens, which is quite usual in Calephelis material not reared. The shape of the primaries is more square cut in *azteca* and not quite so rounded as in *montezuma,* and the tip of primary wings is pointed and inclined to be very slightly falcate. The color and markings of both the upper and lower wing surfaces of the female *azteca* are very similar to those of the male. *C. azteca* is very similar to *montezuma* but there are a couple of noticeable differences in markings, which are more clearly evident

on the lower wing surface. First, the outer basal line is usually doubled or inclined that way in *azteca* while it is single in *montezuma*. Second, the black spots between the two silvery lines are smaller in *azteca* than in *montezuma*, and third, the submarginal or inner silvery line of male *azteca* is decidedly heavier than in *montezuma*. The female allotype was taken at Fortin de las Flores, Veracruz, Mexico, on May 21, 1965 by Dr. G. W. Rawson, at the same locality and date of the holotype, and therefore is assumed to be the female of *azteca*. No life history work has been done with *azteca*.

The male genitalia of *azteca* and *montezuma* are somewhat similar but the transtilla of *montezuma* is longer and more abruptly curved at the end than in *azteca*.

The valvae is longer and with heavier armature in *azteca* than in *montezuma*. The female genitalia are distinctly different in *azteca* from *montezuma* as indicated in the figures. The female genitalia are somewhat like those of *C. huasteca*.

The distribution of *C. azteca* as indicated in the series of specimens at hand, is Fortin de los Flores, Huatusco, Santa Rosa, Orizaba and Jalapa, all in Veracruz, and Tamazunchale and Xilitla, San Luis Potosi, and possibly Victoria in Tamaulipas, Mexico.

The holotype and allotype will be deposited in the U.S. National Museum, and paratypes will be distributed to other museums and collectors with permission of the owners.

No. 25 **Calephelis yucatana** McAlpine, new species

Male holotype primary wing expanse 24 mm., forewing 13 mm. Forty-eight male specimens were examined and genitalia slides or preparations made of all but ten. In this series the primary wing expanse varies from 21 mm. to 25 mm. The male holotype was taken at X-can, Quintana Roo in the Yucatan Peninsula of Mexico, July 19, 1962, by E. C. Welling. Most of the specimens in the series were taken in Quintana Roo and Tabasco and a few at Presidio, Veracruz, Mexico.

The upper surface of the holotype is rather uniform chocolate blackish brown with just a trace of a median darker shade across both wings. Some of the specimens of the series are not so blackish on upper wing surface. The usual four or five concentric lines of small black broken markings are present on the basal half of the wings but are barely discernible except the outer line, which marks the trace of the darker shade across

the wings. Beyond this outer basal line the ground color is a little lighter and the usual two fine silvery lines, submarginal and marginal, are present between which is a row of well defined black dots.

The lower surface is uniform rather light reddish brown with all the markings of the upper wing surface well defined. The outer basal line of black markings is single and not shaded. The fringes are light brown, checkered with white, but not prominently so. The antennae are blackish, with white at the joints, and yellowish at tip of club.

Female allotype primary wing expanse 25 mm., forewing 14 mm., is about average for the eleven female specimens in the series. The upper wing surface is uniform light brown, with all markings fairly well defined and located as in the holotype. The black dots between the two silvery lines are large and prominent. The outer basal line of black markings is well defined and shaded inwardly to form an irregular dark band across the wings which is more discernible than in the holotype. The fringes are light brown checkered with white. The shape of the primary wings is more rounded and square cut at the tip than in the male where it is narrower and pointed and slightly falcate at the tip. The lower surface is uniform pale yellowish brown with all markings of the upper surface repeated and well defined. The black dots between the two silvery lines are prominent. The basal line of black markings are heavier than usual, and the outer of these lines is single and slightly shaded inwardly in some places, and has a tendency for doubling. The female allotype was taken at X-can, State of Quintana Roo, Mexico, on July 8, 1953, by E. C. Welling. Nine of the specimens in the series of eleven were taken in the State of Quintana Roo, Mexico. The female is assumed to be correct because of similarity to the male and the correspondence of date and locality of capture.

The genitalia of both sexes are distinctive as ~~shown in~~ the figures, and quite constant. In the male genitalia the valvae are round and short, with transtilla extending beyond the valvae and well hooked at the end. The female genitalia as figured is quite constant. The known range of this species from specimens I have seen, include the states of Yucatan, Quintana Roo, Tabasco, Oaxaca and Veracruz, Mexico, and also British Honduras and Guatemala.

The holotype and allotype together with some paratypes will be deposited in the U.S. National Museum. Other paratypes

will be distributed to Mexican National Museum, Carnegie, American, and British Museums and some others and to collectors and owners who furnished specimens.

No. 26 **Calephelis maya** McAlpine, new species

Male holotype, primary wing expanse 21 mm., forewing 11 mm. Forty-one male specimens were examined. In this series the primary wing expanse varies from 16 to 21 mm. with average about 19 mm. The male holotype was taken at X-can, Quintana Roo, Mexico, near the border of Yucatan, on June 26, 1963, by E. C. Welling. Most of the specimens in the series were taken in Yucatan, Mexico, at Chichen Itza and Piste.

The upper surface of the holotype is uniform reddish brown with all markings rather heavy and well defined giving this surface a dark appearance. The usual four or five concentric lines of small scalloped black markings are heavy and well defined on the basal half of the wings. There is only a trace of shading along the inner edge of the outer of these basal concentric lines. Beyond this outer basal line are the usual two fine silvery lines, submarginal and marginal, readily discernible, between which is a row of rather large black dots. The submarginal silvery line is scalloped and broken at the veins and not so exserted at the center of the primaries as in some species, while the marginal line is somewhat finer and is close to and parallels the edge of the wing. The whole lower wing surface is light yellowish and reddish brown with all markings of the upper wing surface repeated and well defined. The outer basal line is single with some traces of shading and doubling inwardly. The fringes are pale brown with indistinct white checkering. The antennae are blackish with white at the joints and yellowish at tip of club.

Female allotype primary wing expanse 21 mm., forewing 11 mm. Twenty female specimens were examined, including their genitalia. The allotype was the largest and the other specimens in the series measured from 17 mm. to 19 mm. in wing expanse. The allotype was taken at X-can, Quintana Roo, Mexico at the same locality where the holotype was taken, on June 23, 1963, by E. C. Welling. Nearly all the other specimens in the series were taken at or near Chichen Itza, Yucatan, or X-can, Quintana Roo. The upper surface of the allotype is uniform rather light reddish brown, a little lighter than in the holotype, with all markings somewhat heavier than in the holotype, but

similarly located. The fringes are light brown with white checkering very indistinct. There is no median dark shade across the wings and the outer concentric basal line of black markings at median area is single. The shape of the primaries is more rounded and square cut than the male as usual in most Calephelis.

The outer edge of male primary wing is straighter and not as undulated as in most other Calephelis species. The lower wing surface of allotype is uniform lighter yellowish brown or ochre with all markings of the upper surface repeated and well defined, and the silvery lines and black dots between are especially prominent as indicated in the figures shown. The dates of capture of specimens in the series at hand range from middle of May to early part of January. The genitalia of both male and female are distinctive and constant as shown in the figures. The figures of genitalia of both male and female are made from small paratype specimens, and match the genitalia of the holotype and allotype.

The male genitalia is somewhat similar to those of *C. perditalis* because of the short transtilla, but the female genitalia are distinctly different and constant in *C. maya.*

The known range of *C. maya* from material I have seen includes Yucatan, Quintana Roo, and one specimen from Tabasco, all in Mexico.

The holotype and allotype together with some paratypes will be deposited in the U.S. National Museum. Other paratypes will be deposited in Mexican National Museum, Carnegie, American and British Museums and some others.

No. 27 **Calephelis wellingi** McAlpine, new species

Male holotype primary wing expanse 18 mm., forewing 10 mm. There were fifteen male specimens examined and genitalia slides or preparations made from them. The average primary wing expanse of specimens in the series was 19 mm. with smallest 17 mm. and largest 21 mm. The male holotype was taken at Tepescuintle, Municipio Tenosque, Tabasco, Mexico, 200 m. on Sept. 12, 1962, by E. C. Welling. The specimens in the series both male and female, were taken in Tabasco, Mexico, and in British Honduras, mostly in the fall of the year by E. C. Welling.

The upper surface of the holotype is rather uniform dark chocolate blackish brown, with just a trace of a median irregular narrow blackish shade across both wings. All of the specimens in the series, with the exception of one from Belize District, British Honduras, Nov. 6, 1958, were similar in coloration to the holotype. This one specimen was uniform light yellowish brown with all markings well defined, the silvery ones being especially so. This specimen may be a seasonal form in the area found.

In the holotype and all others in the series the usual four or five concentric lines to the base, of small black linear broken markings are present, but are only barely discernible on the upper surface, except the outer line, which marks the outer edge of the median dark shade caused by the slight inward shading of this line in places. Beyond this outer basal, median broken line of black markings, are the usual submarginal and marginal lines of silver markings, but these are not very discernible on the upper surface. Between the two silvery lines is a row of rather small black dots.

The lower surface of the holotype is uniform light yellowish brown with all markings of the upper wing surface repeated and well defined. The outer basal line of black markings is well defined with traces of inward doubling or slight shading. The submarginal line of silver markings is irregular and heavier than the marginal line and is broken at the veins and slightly outwardly exserted at the center of both wings, while the marginal silvery line is finer and is close to and parallels the edge of the wings. The row of black dots between the marginal and submarginal lines of silvery markings is well defined. The fringes are light brown, checkered lightly with white. The antennae are black with white at the joints and yellowish at the tip of club.

Female allotype, primary wing expanse 20 mm., forewing 11 mm., which is about the average of the nine specimens in the series which varies from 18 to 21 mm.

The upper surface is about the same color as in the holotype, a rather uniform chocolate blackish brown, with all markings indistinct, but present, and arranged as in the holotype. The submarginal silvery line of markings is heavier than in the holotype and the white checkering of the fringes is more prominent. The primary wings of the female are more rounded and square cut than in the male where they are narrower and more pointed at the tip.

The lower wing surface is uniform light yellowish brown with all markings of the upper surface repeated and more prominent. The submarginal silvery line of markings is very heavy. The black dots between the two silvery lines are rather small but well defined. The outer basal line, or median line of black markings is single in the allotype but is doubled or partially so in half of the specimens of the series.

The female allotype was taken at Tepescuintle, Municipio Tenosique, Tabasco, Mexico, 200 meters on October 18, 1962 by E. C. Welling at the same locality where the holotype was taken and is assumed to be the female of the species. The other eight female specimens of the series were taken in British Honduras, mostly at Camp Sibun District, in November of 1958.

The genitalia of both male and female are distinctive as shown in the figures and are quite constant in the type series. The valvae of the male genitalia is rather long and narrow. The transtilla varies slightly in width at posterior end, but is about constant in length, as shown in the two figures of specimens in the series. The female genitalia are distinctive, with but little variation. *Calephelis wellingi* may extend at least into Guatemala, I have a series of Calephelis from Baleu, San Cristobal, Vera Pas, Alta Verapaz, which have similar female genitalia and the general pattern of the male genitalia somewhat similar and general markings and color of wing surfaces also quite similar to *C. wellingi.* This series from Baleu averages 22 mm. in primary wing expanse, considerably larger than average of type series of *C. wellingi.* This series I am calling *Calephelis wellingi baleuensis.* I have also a series of Calephelis from Costa Rica which have female genitalia similar to *C. wellingi* but with male genitalia that differ considerably from *C. wellingi* and am calling this series from Costa Rica *Calephelis browni,* McAlpine, new species.

The holotype and allotype of *Calephelis wellingi* with some paratypes, together with genitalia preparations of same will be deposited in the U.S. National Museum and paratypes will be distributed to the Mexican National Museum, Carnegie Museum, American Museum and the British Museum.

No. 27A **Calephelis wellingi baleuensis** McAlpine, new sub-species

Male holotype primary wing expanse 22 mm., forewing 12 mm. There were fifteen male specimens from Baleu, Mpio

San Cristobal Verapaz, Alta Verapaz, Guatemala, and genitalia slides made from them, in the series. The average primary wing expanse of specimens in the series was about 22 mm., the series varying from 20 to 26 mm.

The male holotype was taken at Baleu, 1350 meters, by E. C. Welling on Aug. 17, 1966. The other specimens in the series were also taken by E. C. Welling, mostly in August, but a few the later part of May and in June and July of the same year. There are three other specimens, two from Panajabal and one from Dept. Solola, Guatemala that appear to be this subspecies.

The upper surface of the holotype is rather uniform blackish brown very similar to the holotype of *C. wellingi* with just a trace of a median irregular narrow blackish shade across the wings, which varies in specimens of the series. The main noticeable superficial difference between this subspecies and typical *wellingi* is the much larger size, of butterfly.

As in typical *wellingi* the usual four lines of small black markings concentric to the base, are present on the basal half of the wings, but are only barely discernible on the upper surface, except the outer line which marks the outer edge of the median dark shade which is caused by the slight inward shading of this line in places. Beyond this outer basal, median broken line of black marking are the usual submarginal and marginal fine lines of silvery markings between which is a row of small black spots, but all these markings are barely discernible on the upper surface.

The lower surface of the holotype is uniform light yellowish brown with all markings of the upper wing surface repeated and well-defined. The two silvery lines of markings and the small black dots between are not so well defined as in typical *wellingi,* and the submarginal silvery line especially is not so heavy as in typical *wellingi.* The outer median basal line of black markings is inclined to be doubled in places but this varies in other specimens of the series. The fringes are brown checkered with white. The antennae are black with white at the joints and yellowish at the tip of the club.

The female allotype was taken on Aug. 13, 1966 by E. C. Welling at Baleu, Guatemala, 1350 meters, at the same locality where the male holotype was taken and at about the same date, and is assumed to be the female of the species. There are eleven female specimens in the type series, all taken at Baleu by E. C. Welling, mostly in the early part of Aug. 1966. Five

other specimens have been examined, two from Panajabal and one from Cayuga, Esquintla and Saboc, LaBoca, all from Guatemala, that appear to be this subspecies.

Female allotype, primary wing expanse 22 mm., forewing 12 mm., about average for the other female specimens in the series. The upper surface of the allotype is of about the same color as the holotype, rather uniform chocolate blackish brown, with all markings present but indistinct, arranged as in the holotype. The median dark shade across both wings is more discernible in the female than in the male series of specimens. The submarginal silvery line of markings is heavier and the fringes are more prominently checkered with white in the female series than in the male series. The primary wings of the female are more rounded and square cut than in the male, where they are narrow and more pointed at the tip.

The lower wing surface is uniform light yellowish brown, with all markings of the upper surface repeated and prominent. The outer basal line or median line of small black markings is single but inclined to be doubled slightly in a few of the specimens of the series.

As shown in the figures, the male genitalia of *wellingi baleuensis* differs somewhat from those of *wellingi* in shape of valvae, but the general pattern is quite similar, and the female genitalia of both are very similar.

There are several Calephelis species or subspecies that occur in Guatemala, often in the same locality, which appear to be closely related and difficult to identify, especially the males. Among these species are *Calephelis argyrodines, costaricicola,* and possibly *perditalis,* also *wellingi* and its subspecies *baleuensis* and *clenchi, browni, yucatana* and *sacapulas.* It is also possible that in this area hybridization is taking place.

Baleu and Quisache in Guatemala are such areas and I have a large series of specimens from these localities. It appears that in these areas Calephelis species are in a state of flux, and with the large number of apparent species concentrated here, more than in any other area I know of, and Guatemala may well be considered the center of distribution of Genus Calephelis.

The holotype and allotype of *Calephelis wellingi baleuensis* with some paratypes will be deposited in the U.S. National Museum and paratypes will be distributed to Carnegie Museum, American Museum and British Museum.

No. 28 **Calephelis sacapulas** McAlpine, new species

Male holotype primary wing expanse 25 mm., forewing 13 mm. The holotype is the only specimen of this species that was obtained and it was taken at Sacapulas, Quiche, Guatemala, 4500 ft. on Aug. 12, 1947 by P. Vaurie for the American Museum. The ground color of the upper surface is a rather light chocolate brown with a prominent, irregular dark shade or band across the middle of both wings. The outer edge of this band is the outer line of four or five concentric irregular broken lines of small black markings on the basal half of the wings. These broken black lines are barely discernible, except the outer line which is well defined and somewhat scalloped in appearance, especially on the secondaries. Beyond this outer median line are the usual two fine silvery lines, submarginal and marginal, which are indistinct between which is a row of small black spots which are rather prominent. The fringes are pale brown with whitish checkering.

The lower surface is uniform ochre with all markings of the upper wing surface repeated and readily discernible. The outer broken line of small black markings on basal half of wings is single and not shaded inwardly or doubled. The submarginal silvery line is not as heavy as usual, and is very irregular, broken at the veins, and almost entirely lacking at the center of the primaries. The marginal silvery line is well defined and rather fine. The edge of primary wings along the upper two-thirds is straight and not undulated as in most species and the tip is squared off.

The genitalia are distinctive as shown in the figure, with a very long and rather slender transtilla that extends a little beyond the end of the valvae. The general appearance of this butterfly with its rather large dark shade or band across both wings, made more prominent by an outward adjoining lighter area, sets it off from other species of Calephelis.

I have corresponded with the American Museum and with Vaurie trying to obtain additional specimens but they have no more. There is always a possibility that the holotype may be a unique specimen.

The holotpe with genitalia slide will be deposited in the American Museum.

No. 29 **Calephelis clenchi** McAlpine, new species

Male holotype primary wing expanse 22 mm., forewing 12 mm. There are four male paratypes in the series with primary wing expanse of 18, 20, and 21 mm. The holotype was taken at Quisache, Mpio Acatenango, Chimaltenango, Guatemala on August 1, 1965 by E. C. Welling at the same locality and at about the same date as the female allotype was taken. Three male paratypes in the series were taken in the same locality on July 23, July 30, and Nov. 20 in 1965 by E. C. Welling and one male paratype in Carnegie Museum, acc. 6540, was taken in Guatemala City, no date. The upper surface of the holotype is rather uniform chocolate brown. The usual four or five lines concentric with the base, of small black broken markings are present on the basal half of the wings but are only barely discernible, except the outer line or median line near the middle of the wings. There is no median dark shade or band across the wings as is found in some species. Beyond the outer basal line are the usual two fine silvery lines the submarginal one being heavier than the marginal, between which is a row of rather small black dots; the fringes are very pale brown, with whitish in places but not prominently. The antennae are black with white at the joints and yellowish at tip of club. The lower surface is uniform rather light yellowish brown or ochraceous with all markings of the upper surface repeated and well defined. The outer basal or median line of irregular black markings is single and not shaded. The two silvery lines are prominent.

The female allotype primary wing expanse 23 mm., forewing 12 mm. Four female paratypes were examined and genitalia slides made, in the type series. The primary wing expanse of the butterflies in the series varies from 21 mm. to 23 mm. The female allotype was taken at Quisache, Guatemala on Aug. 5, 1965 by E. C. Welling and the other females in the series were taken at the same locality from July 23rd to Aug. 3rd, 1965. The female allotype is assumed to be the female of *C. clenchi* as both the male and female specimens of the series were taken at the same locality and at about the same date. Life history work is desirable to fully verify this as other species of Calephelis are found in this same locality.

The upper and lower surfaces of the allotype are about the same color as in the holotype and the markings are similar.

There is not as much difference in primary wing shape of male and female in this species as in some others, it being more like *C. perditalis* in this respect. *C. clenchi* appears to be closest to *C. perditalis.* The genitalia of the male are quite similar to those of *C. perditalis,* but the valvae are more slender and the armature of the valvae is not so heavy as in *C. perditalis.* There are other differences noticeable upon close comparison. The female genitalia of *C. clenchi* are fairly constant and differ from those of *C. perditalis.* The posterior end of the genital plate in the female paratypes vary somewhat from the allotype, in being wider in some specimens. An extreme variation is figured from a specimen taken at Baleu, Guatemala. Other specimens of clenchi, not in the type series were taken as follows: 1 ♀ Baleu, Guatemala, 1 ♀ Zacapa, Guatemala, and 1 ♀ at Pto. del Dialbo, El Salvador.

The holotype and allotype will be deposited in the U.S. National Museum. Two male and two female paratypes will be deposited in Carnegie Museum.

This species was named after Harry Clench of the Carnegie Museum who has been most cooperative and helpful in my work with Calephelis.

No. 30 **Calephelis browni** McAlpine, new species

Male holotype primary wing expanse 19 mm., forewing 11 mm. Nine male specimens have been examined and genitalia slides or preparations made from them, in the series. The average primary wing expanse of specimens in the series was about 19 mm. with largest 21 mm. and smallest 18 mm. The holotype was taken at Turialba, Ais, Costa Rica, 620 meters, May 30, 1946, by H. H. and F. M. Brown. All of the specimens in the male series were taken in Costa Rica, six of which were taken by H. H. and F. M. Brown at type locality.

The upper surface of the holotype is rather uniform dull dark chocolate brown, with traces of a median irregular rather narrow blackish shade across both wings. The usual four or five lines concentric to the base, of small black linear broken markings are present on the basal half of the wings, but are barely visible on the upper surface, except the outer line, which marks the outer edge of the median dark shade, caused by the slight inward shading of this line. Beyond this outer basal median broken line of black markings are the usual sub-

marginal and marginal line of silvery markings, between which is a row of small black dots. The silver markings and black dots are fairly well defined on most of the specimens of the series. The fringes are light brown checkered lightly with white. The antennae are black, with white at the joints and whitish at tip of club. The lower surface of the holotype is uniform yellowish brown with all markings of the upper surface repeated and well defined. The outer basal line of black markings is well defined and doubled in places, but in other specimens of the series this doubling does not occur. The submarginal line of silvery markings is heavier, as usual, than the marginal line, and is straighter near the costa in the primaries, and not so irregular as in *C. wellingi* to which this species is evidently closely related.

Female allotype primary wing expanse 22 mm., forewing 12 mm. There were three female specimens examined and genitalia slides or preparations made from them, in the series.

The other two specimens in the series measured 21 mm. and 18 mm. respectively in primary wing expanse. The upper surface of the allotype is about the same color as the holotype, a rather uniform dark dull chocolate brown, with all markings as in the holotype. However, the black dots between the two silvery lines are larger and more distinct. The primary wings of the female are more rounded and square cut than in the male, where they are narrower and more pointed at the tip.

The lower wing surface is uniform rather light yellowish brown as in the holotype with all markings of the upper surface repeated and well defined, the markings being quite similar to those in the holotype, except that the outer basal, median line is not doubled, which is also true in the other two specimens in the series.

The female allotype was taken at Hda. El Rodeo, Costa Rica, close to the type locality Turrialba and the other two specimens in the series were taken at Turrialba and Juan Vinas, Costa Rica, respectively, and all are assumed to be the females of this species, as genitalia agree in all three specimens.

The genitalia of both male and female are quite distinctive as shown in the figures and are quite constant in the type series. The female genitalia are similar to those of *C. wellingi.* The fact that the male genitalia of *C. browni* differ considerably in general pattern from those of *wellingi,* and that the type

localities of the two are a considerable distance apart, has caused me to consider *C. browni* a distinct species.

I have a large series of Calephelis from several central localities in Guatemala, namely Variedades Such, Muca Such, and Baleu, San Cristobal, Quisache, Acatenango, and several other areas that appear to be quite similar to *C. browni* or *C. wellingi* in general appearance and in genitalia and are hard to separate and definitely identify. It would appear that the Calephelis in this area are in a state of flux, and that hybridization may occur in several of the species and subspecies found here. Among species probably occuring in this area are *Calephelis argyrodines, costaricicola, wellingi* and its subspecies *baleuensis, browni, clenchi, sacapulas, and yucatana*, all of which look very much alike superficially.

The range of *C. browni* appears to be from type locality in Costa Rica south into adjoining Panama and north through Nicaragua, Honduras and Salvador and into Guatemala but more material is necessary to definitely establish this.

The holotype and allotype of *C. browni* with some paratypes together with genitalia preparations of same will be deposited in the American Museum and paratypes will be distributed to the U.S. National Museum, Carnegie Museum and British Museum.

This species was named after F. M. Brown who collected most of the specimens in the type series for the American Museum. In addition, Mr. Brown has kindly checked over my manuscript on Calephelis.

No. 31 **Calephelis schausi** McAlpine, new species

Male holotype primary wing expanse 22 mm., forewing 13 mm. Six male specimens were examined and genitalia slides made of same. Two of these specimens are from Tegucigalpa, Honduras; one from San Pedro Sula, Honduras; one from Honduras, no location, one from Avangariz, Costa Rica, and the male holotype was taken at San Mateo, Costa Rica, in September, and is in the Schaus collection in the United States National Museum. The primary wing expanse in these specimens varied from 20 mm. to 23 mm.

The upper surface of the holotype is dull rather dark slightly reddish brown. The usual four or five concentric rows of black

markings on basal half of both wings are not well defined but blend together, except the outer line which is fairly well defined, but not noticeably shaded inwardly, so there is no median dark shade or band across the wings as is present in many Calephelis species. The usual two silvery lines with small black dots between are present and fairly well defined. The submarginal silvery line is very irregular and broken at the veins and, as usual, heavier than the marginal line which is straight and unbroken. The fringes are pale brown indistinctly checkered with whitish. The antennae are blackish with white at the joints and the tip of the club is yellowish.

The lower surface of holotype is uniform rather light reddish brown or ochre with the black markings and marginal silver line well defined. The submarginal silver line is not well defined and almost entirely wanting at middle of the primaries; in the other paratypes, however, this is not so and all the markings are well defined. The outer basal line of black markings is single and not shaded.

Female allotype primary wing expanse 22 mm., forewing 12 mm. The allotype was taken at Limon Farm, Rda. El Rodeo, Costa Rica, 700 meters, June 14, 1946, by H. M. and F. M. Brown, and deposited in the American Museum.

Three other females were examined and genitalia slides made. They appear to be this species, two are from San Mateo, Costa Rica and one from Chiriqui, Panama.

The assumed allotype appears to have genitalia somewhat different than other known species from that area, so I assume it to be the female of *C. schausi* but future life history work is necessary to definitely determine this.

The upper surface is dull rather dark reddish brown, similar to that of the holotype and the general markings are the same as in the holotype but perhaps a little better defined.

The lower surface is of a uniform ochre as in holotype and all markings are well defined and prominent. The silvery lines are especially so, the submarginal one being very heavy. The white checkering of the fringes is more noticeable than in holotype.

The primaries are a little more square cut in the female than in the male, but it is not so noticeable as in some other species of Calephelis and the male could be mistaken for the female

without genitalic examination. The male genitalia are quite distinctive as shown in the figure with a rather long transtilla, with end or tip curved and circular, more so than in any other species observed. The female genitalia appears to be quite distinctive coming closest to the new species *C. aymaran* from the more southern countries of South America. The apparent range of this species is from Honduras to Panama. This species was named after Wm. Schaus, deceased, of the U.S. National Museum, collector of the holotype and who did outstanding work for many years for the Museum.

The holotype will be deposited in the U.S. National Museum and the assumed allotype will be deposited in the American Museum, while paratypes will be deposited in U.S. National Museum, American, Carnegie and British Museums, with consent of the original owners.

No. 32 **Calephelis guatemala** McAlpine, new species

Male holotype primary wing expanse 25 mm. The holotype was collected in Valley of River Polochic, Hague, Guatemala, Godman-Salvin Collection, 1914-15, and is deposited in the British Museum.

There are seven specimens in the complete type series, four male and three female, all taken within a restricted area in eastern Guatemala. One of the male paratypes is from the Polochic Valley, and the other two from Guazacapan. The holotype is a fair specimen, but somewhat worn. The upper surface is rather uniform dark blackish chocolate brown, with the usual black and silvery markings not very distinct. There are the usual four or five basal concentric lines of black markings, barely discernible, followed by the usual two rather fine silvery lines, indistinct, between which is a row of faint small blackish dots. The outer median basal line of black markings is slightly shaded inwardly, making a faint median dark band or shade across both wings. The fringes are badly worn but remnants indicate they were light brown, slightly checked with whitish. The antennae are brown with white at the joints, not very noticeable. Eyes are light brown, thorax and abdomen dark brown or blackish.

The lower surface of the holotype is rather uniform reddish ochre brown, with all markings of the upper wing surface repeated and well defined. The outer median irregular basal line

of dark markings is inclined to be doubled and slightly shaded inwardly in places. As usual the outer marginal silvery line of markings is fine, connected and straight, while the inner line of silvery markings is heavier, broken at the veins, irregular, and outwardly exserted at the center of the wings.

Female allotype, primary wing expanse 25 mm. It was collected at San Geronimo, Guatemala (probably near head waters of River Polochic) by Champion and is in collection of Godman and Salvin, 1914-15 in the British Museum. One of the female paratypes is from Polochic Valley and the other from Guazacapan. The allotype is a very good specimen. The upper surface of the allotype is of a rather uniform dark blackish chocolate brown, quite similar to color of holotype, with the usual black and silvery markings, not very distinct. There are the usual four or five basal concentric lines of black markings which are indistinct, except the outer one which is heavier and marks the outer edge of a light median band or shade across both wings which is indistinct. The fringes are not worn and are brown about the color of the upper wing surface and prominantly checkered with white. The marginal silvery line is fine, straight, but indistinct, while the submarginal silvery line is irregular and also indistinct. The antenna are dark brown, checked with white at the joints. Eyes are light brown, head, thorax and abdomen dark brown or blackish.

The lower wing surface of the allotype is uniform yellowish ochre brown, a little lighter in color than the holotype, with all markings of the upper wing surface repeated and well defined. The outer median irregular basal line of dark markings is inclined to be doubled and very slightly shaded in places. As usual the outer marginal silvery line of markings is fine, connected and straight. The inner line of silver markings is much heavier, broken at the veins, irregular and outwardly exserted at the center of the wings. The usual black dots between the silvery lines are present but very small.

The genitalia of both sexes are somewhat similar to genitalia of *Calephelis aymaran*, occuring in Peru, Bolivia, Brazil and some other countries in South America. However, the valvae of the genitalia of holotype *C. guatemala* is broader and more rounded and the end of transtilla is more inwardly curved than in *C. aymaran*. The aedeagus of holotype *C. guatemala* is entirely different than that of *C. aymaran* but this does not hold true in other paratypes of *C. guatemala*.

The female genitalia of *C. guatemala* is more variable than female genitalia of *C. aymaran* where it is quite constant. The anterior end of genital plate is not so thick and is more angular than in *aymaran*. The signum appears to be larger in allotype *guatemala* than in *aymaran* although *aymaran* is a larger insect. The female genitalia of *C. guatemala* as shown in the drawings is assumed to be genitalia of the female of the species, as the females were taken in about the same locality as the males.

The holotype and allotype, and paratypes, together with their genitalia, will be deposited in the British Museum. Paratypes will also be deposited in the U.S. National Museum with consent of British Museum, original collectors.

No. 33 **Calephelis inca** McAlpine, new species

Male holotype primary wing expanse 24 mm. Thirty male specimens have been examined and genitalia slides or preparations made of them. The primary wing expanse varies from 20 mm. to 24 mm. in this series, the majority being about 21 mm.

The male holotype was taken at Cacagualito, Dept. Magdalena, Colombia, 1500 ft., May, with no year given and is in the Holland Collection at Carnegie Museum. The upper surface of the holotype is uniform pale (though rather bright) reddish brown with the usual black and silver markings well defined. The usual four or five concentric lines of small broken black markings on the basal half of the wings followed by the two rather fine silvery lines between which is a row of rather prominent small black spots. In the holotype the outer basal line is well defined and sightly shaded inwardly showing a trace of a median darker band or shade across both wings. This median dark shade is more evident in most of the other specimens in the series. In most of the specimens in the series the color of the upper wing surface is more subdued pale brown than in the holotype and the markings are not so well defined.

The lower surface is uniform pale orange with all the markings of the upper wing surface repeated and well defined. The outer median basal line is single but slightly shaded inwardly. The fringes are pale brown slightly checkered with whitish. The antennae are blackish with white at the joints.

Female allotype, primary wing expanse 25 mm. Twelve female specimens have been examined, and genitalia slides or preparations made of them. The primary wing expanse varies

from 20 mm. to 25 mm., mostly being about 23 mm. The upper wing surface is uniform rather darkish brown with all the usual markings fairly well defined, but not as well defined as in the holotype. As in the holotype the median dark shade or band is barely noticeable, but the degree of shading of this band varies in other specimens in the series.

The fringes are pale brown with whitish spots that are only barely noticeable on the lower wing surface.

As is usual with most female Calephelis the primary wings are more rounded and square cut at the tip, while in the male they are narrower and more pointed.

The lower surface of the allotype is uniform pale orange as in the holotype with markings of the upper wing surface repeated but much more discernible than on the upper surface. The two silvery lines are particularly prominent, the inner one being much heavier than the marginal line. The median outer basal line of black markings is single and not shaded inwardly.

The allotype was taken at Cacagualito, Dept. Magdalena, Colombia, 1500 ft., May, with no year given and is in the Holland Collection at Carnegie Museum. The locality is the same as that of the holotype specimen and is accordingly assumed to be the female of the species. Other males and females were taken in the same locality at the same time. The genitalia of both sexes are quite distinctive, as shown in the figures but there is some slight variation, particularly in the males in certain localities. One such occasional variation in male genitalia is a jog in posterior end of the transtilla as shown in the figure. The female genitalia appear to be quite constant. The known distribution of this species as indicated in the series, is Colombia, Venezuela, Trinidad, Panama and adjoining areas of Brazil. Most of the series are from Colombia and Venezuela.

The holotype and allotype, together with some paratypes will be deposited in the Carnegie Museum. Other paratypes will be deposited in the United States National Museum, American Museum, British Museum and some others who supplied specimens.

No. 34 **Calephelis tapuyo** McAlpine, new species

Male holotype primary wing expanse 25 mm. This species is based on two specimens, a male and a female, the latter as-

sumed to be the female of this species because both were taken at Orosi, Brazil in August 1931 by a collector for Albert S. Pinkus and deposited in collection of The American Museum.

The holotype is a very good specimen and the upper surface is rather uniform dark blackish chocolate brown. The usual black and silvery markings are not very distinct, especially the black markings. There are the usual four or five basal concentric lines of black markings, hardly discernible, followed by the usual two rather fine silvery lines, not very discernible, between which is a row of small fine black dots barely visible. In the holotype the outer median basal line is slightly shaded inwardly, making a faint median dark band or shade across both wings. The fringes are light brown checkered with white. The lower surface of the holotype is rather uniform reddish ochre with all the markings of the upper surface repeated and well defined. The outer median irregular basal line of dark markings is single and not inwardly shaded as on the upper surface. As usual the outer marginal silvery line of markings is fine and straight while the inner line of silvery markings is heavier, broken at the veins, irregular and outwardly exserted at center of wings. The antennae are brown, with white at the joints.

The female allotype is a battered and rubbed specimen with primary wing expanse of 25 mm. The upper surface is more of uniform lighter brown than in the holotype, with similar markings as far as can be seen. The lower surface is uniform light yellowish ochre with well defined markings of black and silver, as in holotype. The silvery lines are heavier than on the upper wing surface. The fringes have been worn off.

In the male genitalia of *C. tapuyo* the armature or bristling at end of valvae is not so heavy, and the posterior end of transtilla is broader and not so slender as in *C. argyrodines* and the aedeagus is slightly different shaped in the two species.

The female genitalia are quite similar to that of *C. argyrodines,* but the bursa of *C. tapuyo* is larger with somewhat smaller signum than in *C. argyrodines* although the butterflies are about the same size. Because *argyrodines* does not appear to be established, by any available records, much south of Guatemala it would appear that *C. tapuyo* could well be considered a distinct species rather than a subspecies.

The name Tapuyo is an Indian race of the Amazon River

region mentioned in the "Naturalist on the River Amazons" by Henry W. Bates about 1848 on page 644.

The holotype and allotype with genitalia slides of same will be deposited in the American Museum.

No. 35 **Calephelis aymaran** McAlpine, new species

Male holotype, expanse of primary wings 20 mm. About 135 specimens have been examined, which range from 20 mm. to 24 mm. in wing expanse. The holotype was taken at Rio Surutu, E. Bolivia, 350 meters, March, 1915, by J. Steinbach, C. M. Acc. 5570, and deposited in Carnegie Museum.

The upper surface of holotype has background color of a rather light chocolate brown, overlaid with the usual markings, which are fairly well defined. The usual four or five concentric rows or lines, of small black linear markings are present on basal half of the wings, but are only barely visible. The outer of these basal rows or lines is shaded inwardly to form an irregular blackish median band or shade across both wings, not very prominent in the holotype but more so in some of the other specimens. Beyond this median band are the usual two rather fine silvery lines, submarginal and marginal, which are not very discernible, between which is a row of rather prominent small black dots. The submarginal or inner silvery line is irregular and broken at the veins, and somewhat exserted outwardly at the center of the wing, while the outer silvery line is fairly straight, paralleling the edge of the wing. The fringes are light brown and faintly checkered with white on primary wings, at apex and at intersection of outer and inner margins. The antennae are blackish, with white checking at the joints. The head and thorax are concolorous with or a little darker than upper wing surface. The lower surface is uniform ochre or pale yellowish, reddish brown, with all linear markings of the upper wing surface repeated but more distinct and better defined. The outer basal line of broken black markings in the holotype is single, except for slight doubling at anterior end of primaries, (not true in some other specimens). The submarginal silvery line is much heavier than the marginal silvery line on the lower wing surface.

Female allotype, expanse of primary wings 20 mm. About thirty specimens have been examined, which range from 20 mm. to 22 mm. in primary wing expanse. The wing shape of

both sexes is quite similar and it is difficult to separate them except by genitalia examination. The allotype was taken at Rio Surutu, E. Bolivia, 350 meters, by J. Steinbach and placed in Holland Collection at Carnegie Museum. As the allotype was taken at the same location, and by the same collector, as the holotype, it is assumed to be the female of the species.

The color and markings of both the upper and lower surface of the allotype are quite similar to those of the holotype. Both holotype and allotype genitalia are distinctive as shown in the figures. The male genitalia appears to be quite constant, with but slight variation throughout the range of the species, but the female genitalia appears to be quite variable.

From the considerable material at hand, most of which was supplied by the British Museum and the Carnegie Museum, this species appears to have a wide range of distribution in South America, including Peru, Brazil, Chile, Bolivia, Paraguay, Argentina and probably adjoining areas.

The holotype and allotype together with their genitalia slides will be deposited in the Carnegie Museum together with some paratypes. Also paratypes, with their genitalia slides, will be deposited in the British Museum. Also paratypes will be deposited in the United States National Museum, American Museum and some South American Museums, with consent of the owners who supplied the material.

No. 36 **Calephelis braziliensis** McAlpine, new species

Male holotype, expanse of primary wings 20 mm., which was about average for sixteen specimens examined, that ranged from 15 mm. to 22.5 mm. in wing expanse. The holotype was taken at Cabo, Est. Pernambuco, Brazil, labeled W. A. Forbes, with no date given, and in Godman-Salvin collection 1914-15 in the British Museum.

The upper surface of holotype has background color of a rather light chocolate reddish brown. The usual four or five concentric rows of small black linear markings are present on the basal half of the wings, but are only barely discernible. The outer of these basal lines is shaded inwardly to form a rather broad and well defined dark blackish median band across both wings. Beyond this band are the usual two rather fine silvery lines, submarginal and marginal, between which is a rather prominent row of black spots of markings that run to-

gether somewhat on the upper surface of the primary wings. The submarginal or inner silvery line is slightly heavier, irregular and broken at the veins and somewhat exserted outwardly at the center of the wings, while the marginal or outer silvery line is finer and fairly straight, paralleling the edge of the wing. The fringes are concolorous with upper wing surface and are checkered with whitish. The antennae with club are blackish with white at the joints, while the head, thorax and abdomen are concolorous with or a little darker than the upper wing surface.

The lower surface of the holotype is uniform ochre or yellowish, reddish brown, with all linear markings of the upper wing surface repeated, but more distinct and better defined, due to lighter background. The outer basal line of broken black markings is single, and not shaded. The holotype is a fairly fresh specimen. Most of the specimens in the series are worn, but still conform well with the holotype.

Female allotype, expanse of primary wings 21 mm., which was about average for five specimens examined in the series. The primary wings are more rounded and square cut than in the male, where they are slightly narrower and more pointed at the apex. The allotype, as well as the other females in the series, is somewhat worn, but markings are similar to holotype. The color appears to be somewhat lighter, and the dark band across the wings is narrower and not so prominent as in the holotype, but this may be due largely to wear. The submarginal silvery line is much heavier and more irregular on the lower wing surface of the female than in the male. The color of the lower surface of the allotype is lighter and more yellowish brown than in the holotype.

The female allotype is labeled, Pernambuco, A. M. Moss, Rothchild Bequest, B.M. 1939-1 and is deposited in the British Museum. The allotype and females in the series are assumed to be females of *C. braziliensis* as indicated by the holotype, as they are found in the same area.

The male genitalia are distinctive as shown in the figures, but the female genitalia are somewhat similar and nearest to *C. inca* from Venezuela and Colombia.

There is a badly worn, small male specimen of a Calephelis with expanse of primary wings 17 mm. in the British Museum, labeled San Jose de Guatemala by Champion, in the Godman-

Salvin Coll. 1914-15, that looks like and has genitalia like *Calephelis braziliensis*. I have many other Calephelis specimens from practically the same locality in Guatemala, but none other that appears to be like *C. braziliensis*. It is to be noted that several of the *C. braziliensis* specimens, including the holotype are also in the Godwin-Salvin Collection, 1914-15 in the British Museum so it appears that this specimen was probably mislabeled as to locality according to evidence at hand.

The known range of *C. braziliensis* includes States of Pernambuco, Bahia, Ceara and Parabia in Brazil, South America. The holotype and allotype together with their genitalia slides will be deposited in the British Museum, as well as several paratypes, also paratypes will be deposited in the United States National Museum, American Museum and some others with consent of the owners.

No. 37 **Calephelis burgeri** McAlpine, new species

In the study of Calephelis material from the British Museum a female specimen was found which appears to be a new species. It has two labels on it, a small white label with black border, "End of rainy season," a larger white label with black border, "Purnio Co. E. X. — E. XI 96 (Dr. Burger)." These labels would indicate that the specimen was taken by Dr. Burger in October or November at end of rainy season, in 1896.

In correspondence Mr. Tite of the British Museum says: "I could not find the name Purnio on our maps but the name is mentioned by Dr. Burger in the book on his travels 'Reisen eines Naturforschers in Tropischen Sud America,' Leipsig 1900 on page 90. It is a small tributary of the Rio Magdalena, in the gold mining area of the Central Cordillera, Colombia. It joins the Magdalena between Conejo and Yeguas and is near a place called Victoria. A 280 meter plateau is mentioned near Purnio, and it may be where the insect was captured. Conejo is the only place mentioned that I can find on the map. It is on the R. Magdalena at about 5 degrees 30 minutes N. and I presume Purnio to be somewhere near it, probably to the south."

Female allotype primary wing expanse 24 mm. Upper surface lying within the inner metallic line is rather dull dark brown color, while balance of wing lying outside of inner metallic line is a trifle lighter reddish brown. The usual small black markings on basal half of upper wing surface are present but not well defined. The two marginal metallic lines are

silvery and quite distinct, the outer line being rather fine and straight, while the inner line is much heavier, irregular and more broken at the veins. It is not so inwardly exserted between M.1 and M.2 as in *C. laverna* that occurs in Colombia but is straighter, particularly noticeable on the lower surface. The usual row of black dots between the two silvery lines is present with the spots rather large. These spots are about midway between the two metallic lines and not closer to the outer metallic line as they are in *C. laverna*.

The fringes are brown and prominently checkered with white on both primaries and secondaries, while in *laverna* there is no such checkering.

The lower surface is dull rather dark yellowish brown, darker than in most Calephelis species, including *C. laverna*, and all markings of the upper surface are repeated and well defined. The wings are rounded and square cut as in *C. laverna* and in most females of Calephelis. The genitalia are quite distinctive as shown in the figure, and somewhat different from any other I have seen.

The holotype is such a well marked and attractive specimen with genitalia apparently different from other species, that I thought it best to name it, although it is just possible that it is a unique specimen of a known species.

The holotype with genitalia slide will be deposited in the British Museum.

Fig. 6.—Upper set of six, upper side facies. Lower set of six, lower side facies. X ¾.

Top left, ♂ *Calephelis muticum* McAlpine. Paratype no. 5. Willis (swamp, Washtenaw County, Michigan), July 12, 1936.

Top right, ♀ *Calephelis muticum* McAlpine. Bloomfield, Oakland County, Michigan. Aug. 1, 1915. W. S. McAlpine.

Center left, ♂ *Calephelis borealis* (Y. and R.). Sussex County, New Jersey, Otto Buchholz, July 10, 1938.

Center right, ♀ *Calephelis borealis* (Y. and R.). Sussex County, New Jersey, Otto Buchholz, July 4, 1938.

Lower left, ♂ *Calephelis virginiensis* G.-M. Fort Myers, Florida, Barnes collection, April 24, 1930.

Lower right, ♀ same.

CALEPHELIS PHOTOS

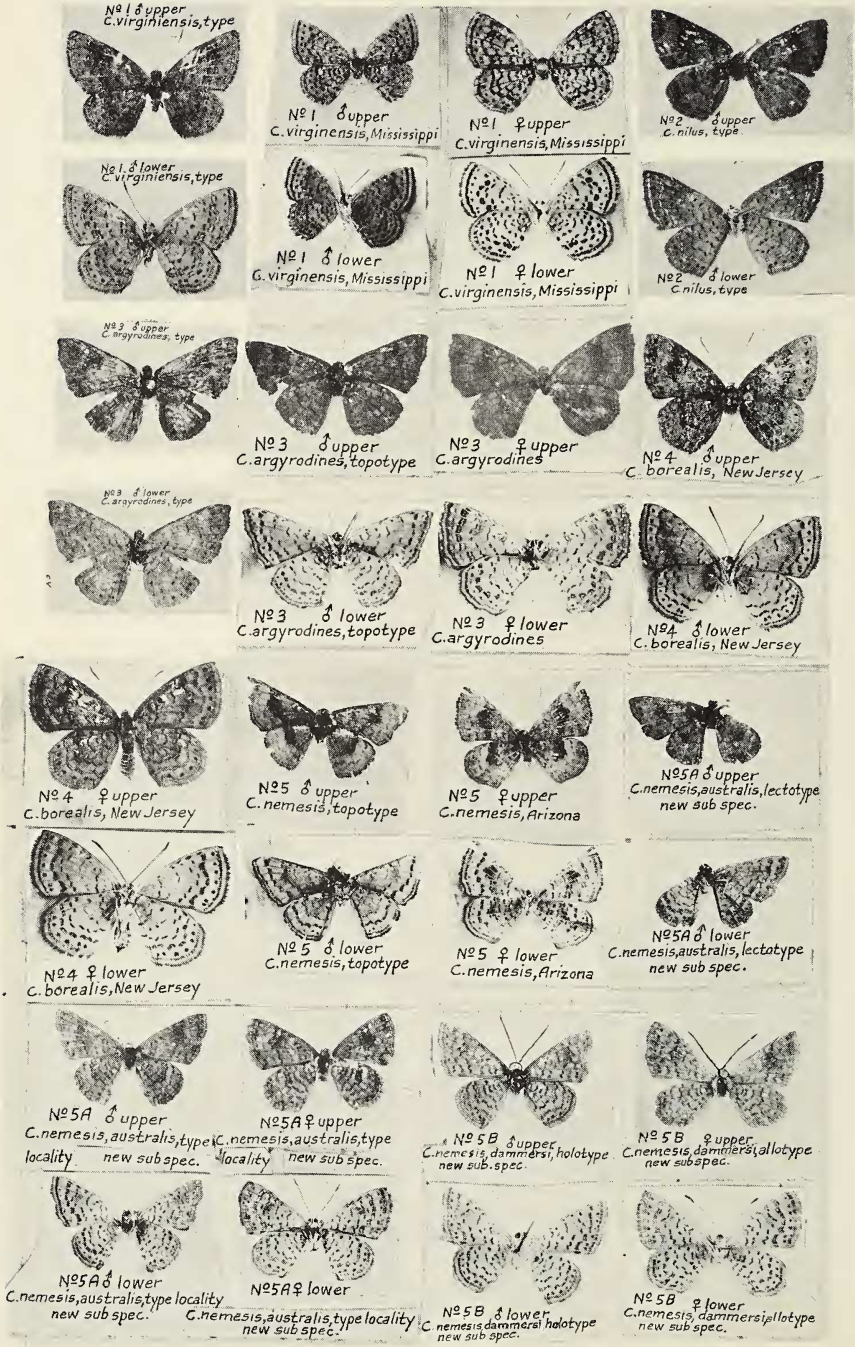


Figure 7

CALEPHELIS PHOTOS

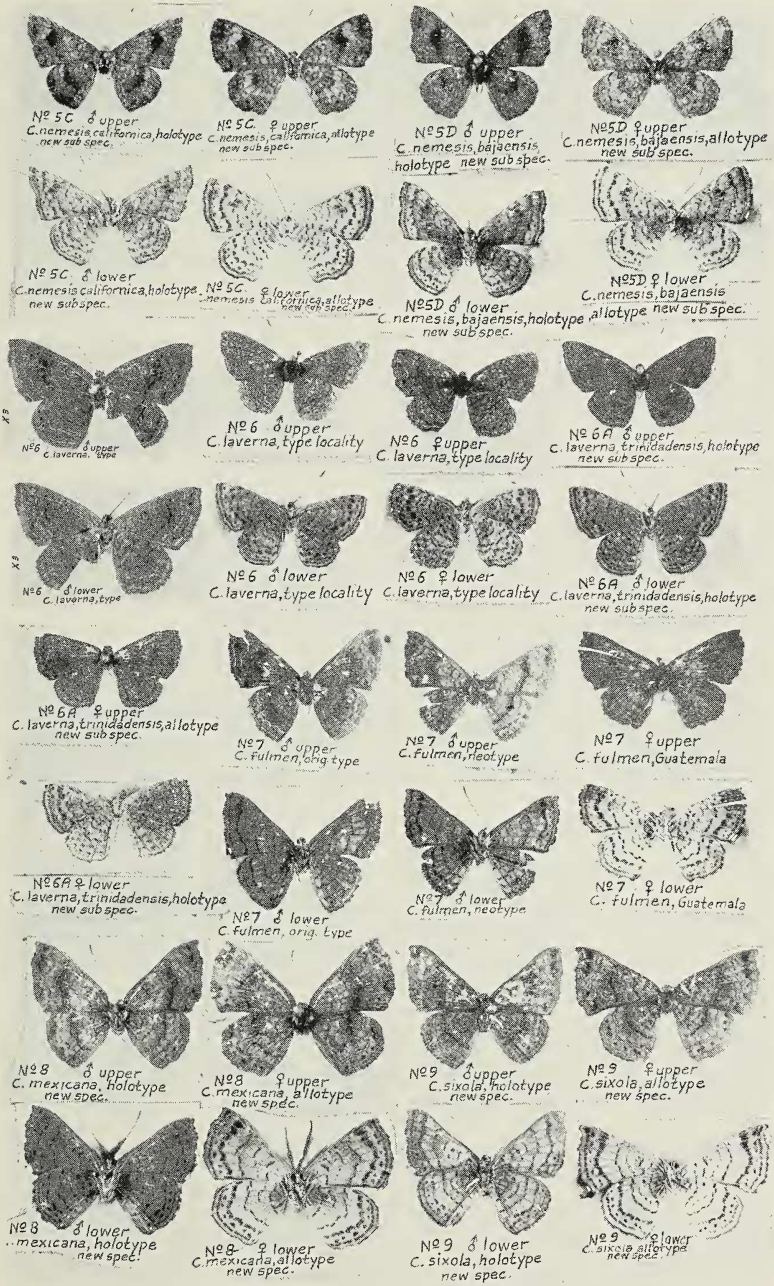


Figure 8

CALEPHELIS PHOTOS

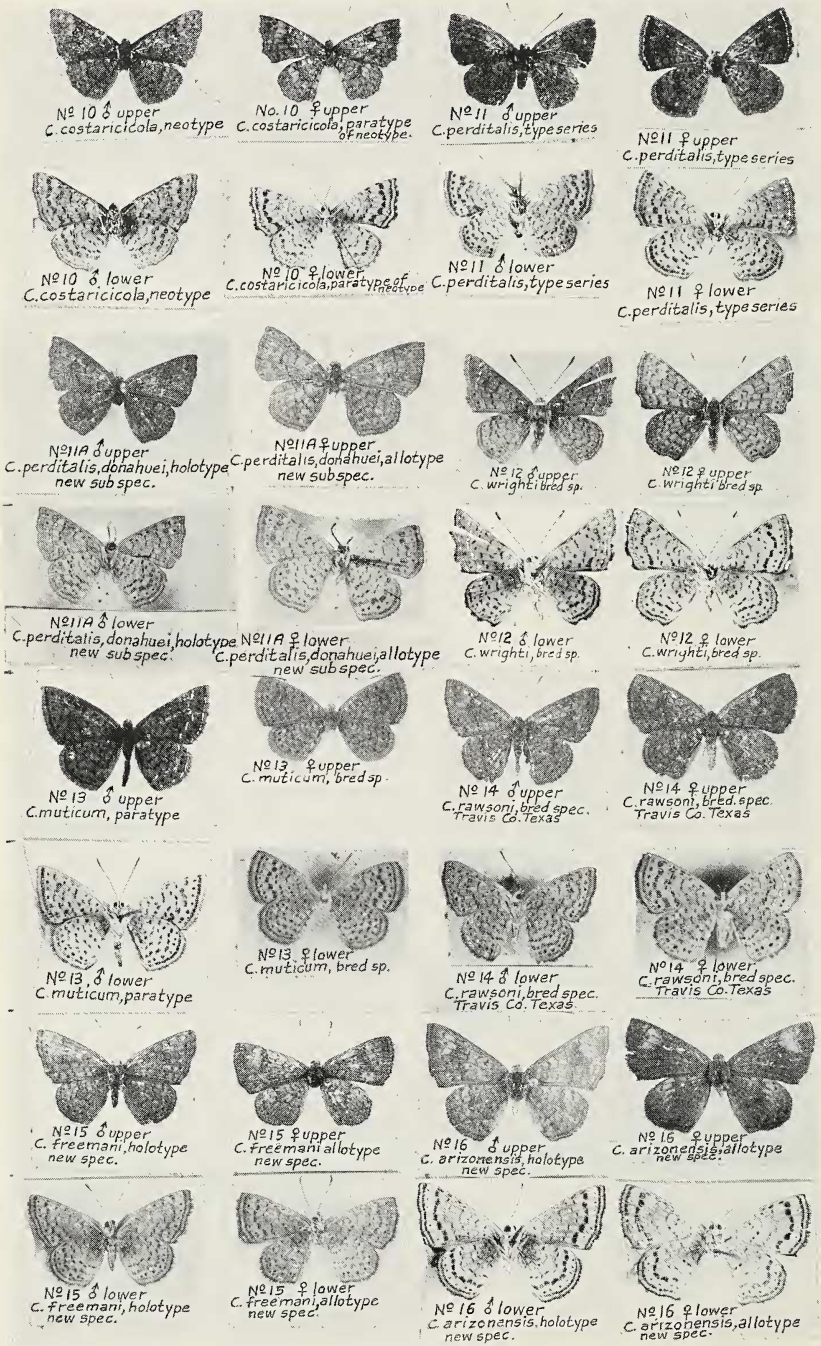


Figure 9

CALEPHELIS PHOTOS

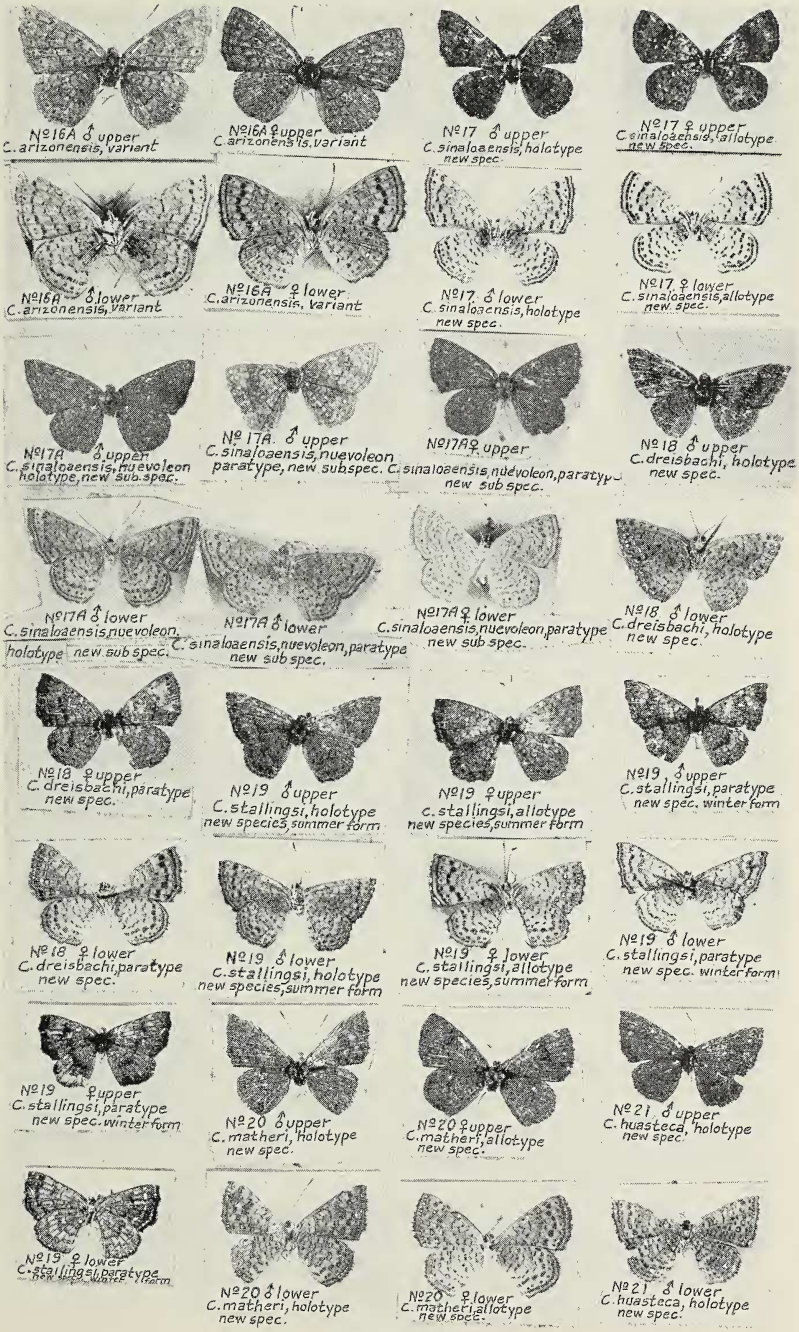


Figure 10

CALEPHELIS PHOTOS

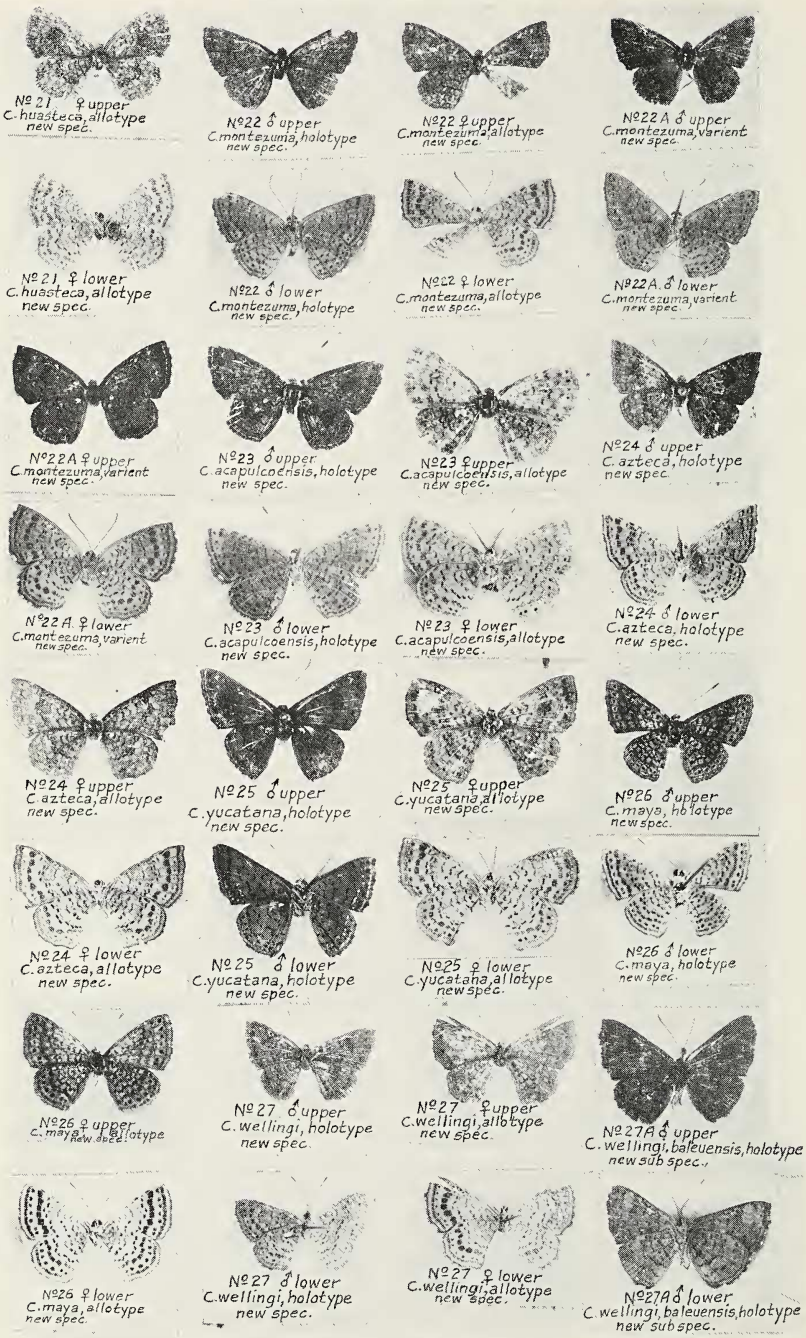


Figure 11

CALEPHELIS PHOTOS

Figure 12

CALEPHELIS PHOTOS

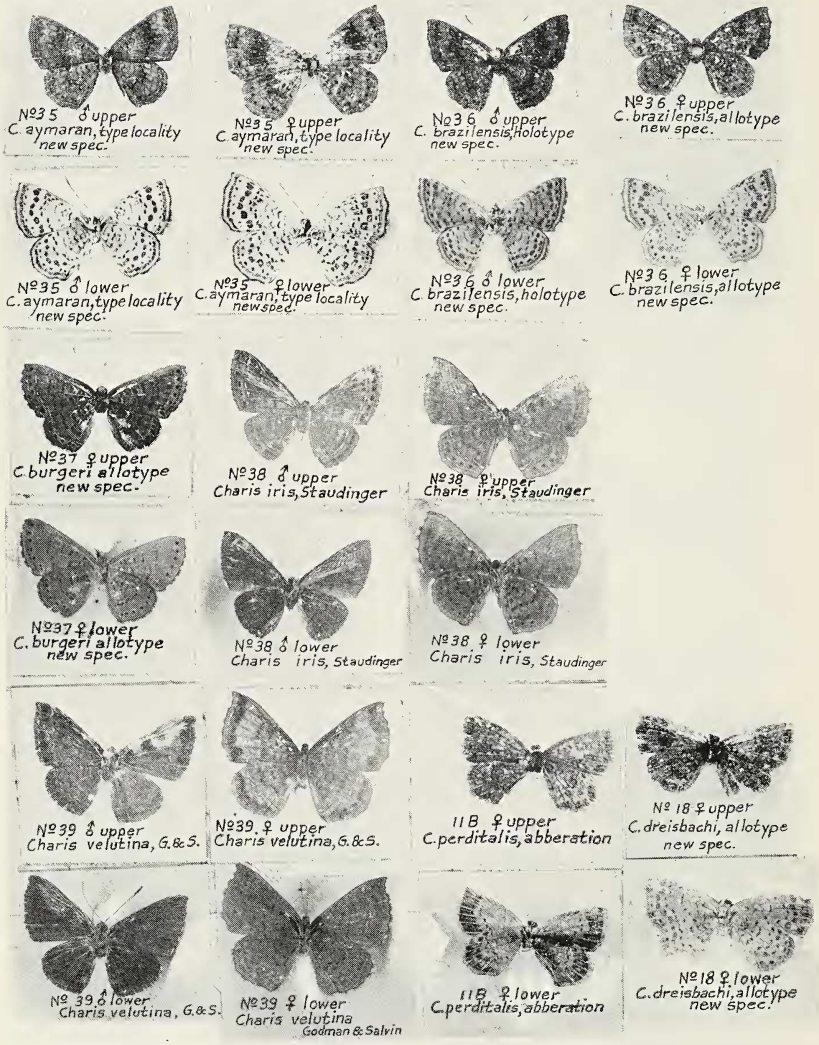


Figure 13

EXPLANATION OF SLIDES USED IN GENITALIA AND WING VENATION DRAWINGS

No. 1 *Calephelis virginiensis,,* Slide No. 606 Clinton Hines Co. Mississippi June 28, 1959 by Bryant Mather, Slide No. 1114, Baldwin Co., Alabama, May 22, 1927, Collection of Brooklyn Museum now in U.S.N.M. Slide No. 763 Clinton Hines Co. Mississippi, June 7, 1957. Collection of Bryant Mather. ♂ Slide No. 1389 (wing venation) Deschamps, Alabama.

No. 2 *C. nilus,* a doubtful species or species inquirenda, "Venezuela, Moritz type" label by Felder, slide No. 9605 in British Museum.

No. 3 *C. argyrodines,* Slide No. 256, Duenas, Guatemala by G. C. Champion. Collection of Godman-Salvin in B.M. Slide No. 776, Duenas, Guatemala by G. C. Champion, Godman-Salvin Coll. in B. M. ♂ Slide No. 204 (wing venation) San Pedrone, Yepocapa, Guatemala.

No. 4 *C. borealis,* Slide No. 2, Rockview, Pennsylvania by W. J. Gertsch, Slide No. 1113 Sussex C. New Jersey July 10, 1938 by Otto Buckholz, Slide No. 765, Sussex Co. New Jersey July 4, 1935 by Otto Buckholz. ♂ Slide No. 1394 (wing venation) Newton, New Jersey.

No. 5 *C. nemesis,,* Slide No. 141, Arizona in Coll. of W. H. Edwards in C. M. Slide No 140 Tucson, Arizona, by Geo. P. Englehardt. Slide No. 529 Proctors Ranch Madera Canyon Santa Rita Mts., Pima Co. Ariz., July 26, 1961 by Killian Roever. Slide No. 894 Madera Canyon Santa Rita Mts. Pima Co. Ariz. Slide No. 2780 Tuscon, Arizona, Picket Post Mt., by F. H. Graham. ♂ Slide No. 1612 (wing venation) Redington, Pima Co. Arizona.

No. 5A *C. nemesis australis,* Slide No. 71, type series, San Antonio, Texas, W. H. Edwards coll. in C. M., Slide No. 569, San Antonio, Texas Aug. 21, 1916 by W. W. Newcomb, Slide No. 2163 type series, San Antonio, Texas, W. H. Edwards coll. in C. M. ♂ Slide No. 569 (wing venation) San Antonio, Texas.

No. 5B *C. nemesis dammersi,* new sub. spec., Slide No. 722, Blythe, Riverside Co., Cal. July 21, 1931 by C. M. Dammers, Slide No. 2783, Blythe, Riverside Co., Cal. July 30, 1929 by C. M. Dammers, Slide No. 2784 Blythe, Riverside Co., Cal. July 3, 1935 by C. M. Dammers, Slide No. 1123 Blythe, Riverside Co., Calif. July 27, 1931 by C. M. Dammers. ♂ Slide No. 168 (wing venation) Blythe, California.

No. 5C *C. nemesis californica* new sub. spec., Slide No. 116, Riverside, Cal. Sept. 28, 1938 by C. M. Dammers, Slide No. 1119, Lakeside, San Diego Co., Cal. Sept. 26, 1941 by F. T. Thorne, Slide No. 2050, Gypsum Canyon, Orange Co., Cal. July 28, 1928 by C. M. Dammers, Slide No. 2169 Riverside, Calif. June 25, 1931 by C. M. Dammers. ♂ Slide No. 720 (wing venation) San Diego, California.

No. 5D *C. nemesis bajaensis,* new sub. spec., Slide No. 1548, A. San Bernardino, Sierra Lasuna. Baja Pen. Mexico, Nov. 18, 1961 C. M. Ace in C. M., slide No. 1547 Ro Palmarito, Baja Peninsula, Mexico, Nov. 30, 1961 Cary Carnegie Exp. in C. M. ♂ Slide No. 1527 (wing venation) San Jos del Cabo, Baja Penin., Mexico.

No. 6 *C. laverna,* Slide No. 535, Gatun, Canal Zone, Panama Aug. 14, 1945, Slide No. 1320, Canal Zone, Panama June 11, 1911, Yale Peruv. Exp. U.S.N.M. Slide No. 1135 El Queremal Carretera al mar val Colombia Aug. 1945 Richter Coll. A. M., Slide No. 1214, Gatun, Canal Zone, Panama Coll. of R. J. Jae.

No 6A *C. laverna, trinidadensis,* new sub. spec., Slide No. 2018, St.

Anns, Trinidad, British West Indies Apr. 11, 1933 by Albert Pinkus. A. M. Slide No. 811 Botanical Gardens, Port of Spain, Trinidad, Feb. 26, 1933 by Albert Pinkus, Amer. Mus. ♂ Slide No. 1398 (wing venation) Botanical Gardens, Port of Spain, Trinidad.

No. 7 *C. fulmen*,, Slide No. 667, Chiriqui Ribbe, Costa Rica, Berlin Museum, Slide No. 976 Cayuga Guatemala, Sept. Schaus and Barnes, in U.S.N.M. ♂ Slide No. 1373 (wing venation) Soloyapan, El Bajo, Mexico. ♀ Slide No. 1172 (wing venation) El Salto, Mexico.

No. 7A *C. fulmen* (variants), Slide No. 931 Xilitla, San Luis Potosi, Mexico by J. P. Donahue, Slide No. 935 Xilita, San Luis Potosi, Mexico by J. P. Donahue, Slide No. 1064, El Salto, San Luis Potosi, Mexico by H. A. Freeman.

No. 7B *C. fulmen* (variants), Slide No. 666, Tepescuintle, Municipio Tenosique, Tabasco, Mexico by E. C. Welling. Slide No. 623 Tepescuintle, Municipo Tenosique, Tabasco, Mex. Sept. 8, 1962, E. C. Welling. Slide No. 975 Tepescuintle Municipio Tenosique, Tabasco, Mexico by E. C. Welling.

No. 8 *C. mexicana*, new spec., in fulmen group, Slide No. 672, 17 mi. east of Concordia, Sinoloa, Mexico Nov. 1, 1961 by C. M. Ace, C. M. Slide No. 596, 19 mi. east of Concordia, Sinoloa, Mexico by C. M. Ace, C. M. Slide No. 1066 Tamazunchale, San Luis Potosi, Mexico Aug. 7, 1954 by H. A. Freeman, Slide No. 814 Xalapa, Jalapa, Vera Cruz, Mexico by W. Schaus, Slide No. 992, Fortin de los Flores Vera Cruz, Mexico, May 20, 1965 by Geo. W. Rawson, ♂ Slide No. 991 (wing venation) Fortin de los Flores Vera Cruz, Mexico, May 21, 1965 by G. W. Rawson.

No. 9 *C. sixola*, new spec., in fulmen group, Slide No. 973, Sixola River, Costa Rica, Sept. Schaus and Barnes Coll. in U.S.N.M., Slide No. 807 Banana River, Costa Rica, Mar. 1907 by Wm. Schaus U.S.N.M.

No. 10 *C. costaricicola*, Slide No. 1179 Mt. Redondo, Costa Rica, Mar. 2, 1902 Cary Coll. in C.M., Slide No. 822 Monte Redondo Costa Rica, Mar. 3, 1902, Cary Coll. C.M. Slide No. 823 Volcan, Frazu, Costa Rica, Apr. 22, 1902 Cary in C.M. ♂ Slide No. 1182 (wing venation) San Jose, Costa Rica.

No. 11 *C. perditalis*, Slide No. 124, San Benito, Texas, July 16, 1923 Barnes Coll. U.S.N.M., Slide No. 608, San Benito, Texas, Barnes Coll., Slide No. 781 San Benito, Texas, Barnes Coll., Slide No. 2166 San Benito, Texas, Barnes Coll. in U.S.N.M. ♂ Slide No. 153 (wing venation) Brownsville, Texas.

No. 11A *C. perditalis* (variants), Slide No. 127 Brownsville, Texas, May 18, 1938, Coll. of A. E. Brower, Slide No. 128 Loredo, Texas, June 13, 1935, H.A. Freeman, Slide No. 780 (aberrant) Cameron Co., Texas, Oct. 10, 1954, R. O. Kendall, Slide No. 1149 Brownsville, Texas, May 18, 1938, A. E. Brower, Slide No. 1153, Brownsville, Texas, June 23, 1938, A. E. Brower, Slide No. 1154, Corpus Christi, Texas, June 6, 1927, Frank Chermock, Slide No. 1232, Kennedy Co., Texas Bred Spec. by R. O. Kendall.

No. 11B *C. perditalis donahuei*, new sub-spec., Slide No. 928, 3 mi. S.W. of Jacala, Hidalgo, Mexico, El. 5800 ft. Aug. 1, 1963 by J. P. Donahue, Slide No. 927, 3 mi. S.W. of Jacala, Hidalgo, Mexico, El. 5800 ft. Aug. 1, 1963 by J. P. Donahue.

No. 12 *C. wrighti*, Slide No. 1112, Riverside, Cal. Aug. 22, 1938 by C. M. Dammers, Slide No. 1110, Riverside, Cal. July 11, 1933 by C. M. Dammers. ♂ Slide No. 1393 (wing venation) Grapevine Mt. Sissors Crossing, San Diego, Cal. by F. T. Thorne.

No. 13 C. muticum, Slide No. 1115, Willis, Wayne Co., Mich. July 17, 1932, by Sherman Moore, Slide No. 82 Mahopac, Oakland Co., Mich., July 17, 1932 by W. S. McAlpine, Slide No. 1109, Willis, Wayne Co., Mich., July 12, 1936 by W. S. McAlpine, Slide No. 766 Mahopac, Oakland Co., Mich., July 17, 1932, by W. S. McAlpine, ♂ Slide No. 1395 (wing venation), Oxford, Oakland Co., Mich. by W. S. McAlpine.

No. 14 *C rawsoni,* Slide No. 900, New Braunfels, Landa Park, Comal Co., Texas, Mar. 23, 1964 by W. S. McAlpine. Slide No. 899, New Braunfels, Landa Park, Comal Co., Texas, Mar. 24, 1964 by W. S. McAlpine, Slide No. 895 Landa Park, New Braunfels, Comal Co., Texas Mar. 23, 1964 by W. S. McAlpine, Slide No. 805 Landa Park, New Braunfels, Comal Co., Texas Mar. 29, 1961 by W. S. McAlpine. ♂ Slide No. 1611 (wing venation) New Braunfels, Texas, June 14, 1959 by W. S. McAlpine.

No. 15 *C. freemani,* Slide No. 876 Alpine, Texas June 9, 1942 by H. A. Freeman, Slide No. 861 Alpine, Texas, Davis Mts. June 5, 1942 by H. A. Freeman, Slide No. 346 Alpine, Texas, Davis Mts. June 5, 1942 by Stallings and Turner, Slide No. 859 Alpine, Texas, Davis Mts. June 5, 1942 by H. A. Freeman. ♂ Slide No. 330 (wing venation) Alpine, Brewster Co., Texas by H. A. Freeman.

No. 16 *C. arizonensis,* Slide No. 1661 Brown Canyon Baboquivari Mts. Pima Co., Arizona, by J. W. Tilden Mar. 17, 1938, Slide No. 1660 Brown Canyon, Baboquivari Mts. Pima Co., Arizona by J. W. Tilden on Mar. 20, 1938, Slide No. 2766 Brown Canyon, Baboquivari Mts., Pima Co., Arizona, Mar. 18, 1938 by J. W. Tilden. ♂ Slide No. 132 (wing venation) Brown Canyon, Baboquivari Mts., Pima Co., Ariz. J. W. Tilden.

No. 16A *C. arizonensis,* variants (probable seasonal forms), Slide No. 1662 Baboquivari Mts., Pima Co., Arizona by O. C. Poling Oct. 1-15, 1923, Slide No. 75, Baboquivari Mts., Pima Co., Arizona, Sept. 15-30, 1923 by O. C. Poling, Slide No. 2160 Baboquivari Mts., Pima Co., Arizona, Oct. 15-30, 1923 by O. C. Poling, Slide No. 2172 Baboquivari Mts., Pima Co., Arizona by O. C. Poling, Oct. 15-30, 1923. ♂ Slide No. 1399 (wing venation) Baboquivari Mts., Pima Co., Ariz., Poling. Oct. 1-15, 1923 U.S.N.M.

No. 17 *C. sinaloaensis,* new spec., Slide No. 905, 19 mi. East of Concordia, Sinaloa, Mexico, Oct. 25, 1951 C. M. Ace, C.M., Slide No. 673 five miles West of Concordia, Sinaloa, Mexico, Nov. 2, 1961 by C. M. Ace, C.M., Slide No. 919 Mazatlan, Sinaloa, Mexico, Oct. 28, 1961 by C. M. Ace, C.M. ♂ Slide No. 1400 (wing venation) 17 mi. East of Concordia, Sinaloa, Mexico.

No. 17A *C. sinaloaensis, nuevoleona,* new sub-spec., Slide No. 1042, Iturbide, Nuevo Leon, Mexico, Aug. 16, 1965 by W. S. McAlpine U.S.N.M. Slide No. 1140, State of Durango, Mexico, July 27, 1947 by W. Gertsch and M. Cazier for A.M.

No. 18 *C. dreisbachi,* new spec., Slide No. 1245 San Blas, Sinaloa, Mexico Sept. 13, 1957 by R. R. Dreisbach, Slide No. 1247 San Blas, Sinaloa, Mexico on Sept. 13, 1957 by R. R. Dreisbach, Slide No. 1244 San Blas, Sinaloa, Mexico, Sept. 13, 1957 by R. R. Dreisbach. ♂ Slide No. 1246 (wing venation) San Blas, Sinaloa, Mexico, Sept. 13, 1957 by R. R. Dreisbach.

No. 19 *C. stallingsi,* new spec., Slide No. 731 Valles, Mexico, June 8, 1941 by Stallings and Turner, Slide No. 792 two miles N.E. of Catemaco, Vera Cruz, Mexico on July 27, 1962 by G. N. Ross, Slide No. 1435 Tamazunchale, San Luis Potosi, Mexico, Sept. 23, 1966 by W. S. McAlpine, Slide No. 769 Tamazunchale, Mexico May 17, 1962 by Geo. W. Rawson. ♂ Slide No. 238 (wing venation) Valles, Mexico, ♀ Slide No. 1044 (wing venation) El Salto, Mexico.

No. 20 *C. matheri,* new spec., Slide No. 1633 San Jose, Purua, Michoacan, Mexico on Nov. 27, 1965 by Bryant Mather, Slide No. 1629 San Jose, Purua Michoacan, Mexico, Nov. 25, 1965 by Bryant Mather, Slide No. 1630 San Jose, Purua, Michoacan, Mexico, Nov. 25, 1965 by Bryant Mather. Slide No. 1628, San Jose, Purua Michoacan, Mexico, November 25, 1965 by Bryant Mather. ♂ Slide No. 1629 (wing venation) San Jose, Purua, Michoacan, Mexico.

No. 20A *C. matheri,* new spec., (variants), Slide No. 980 El Saus, Zacatecas, Mexico, El. 2100 M. Nov. 21, 1964 by E. C. Welling, Slide No. 979 El Saus, Zacatecas, Mexico, El. 2100 M. Nov. 21, 1964 by E. C. Welling, Slide No. 777 Baleas, Guerrero, Mexico, El. 1500 ft. by Wm. Schaus, U.S.N.M. Slide No. 1636 Ajijic, Jalisco, Mexico, Dec. 17, 1966 by R. G. Wind, C.M.

No. 21 *C. huasteca,* new spec., Slide No. 1450 Tamazunchale, San Luis Potosi, Mexico on June 19, 1964 by H. A. Freeman, Slide No. 1451 Tamazunchale, San Luis Potosi, Mexico, June 19, 1964 by H. A. Freeman, Slide No. 1046, Tamazunchale, San Luis Potosi, Mexico on July 18, 1963 by H. A. Freeman, Slide No. 773, Tamazunchale, Mexico June 6, 1941 by Stallings and Turner.

No. 22 *C. montezuma,* new spec., Slide No. 1444 Cuidad Valles, San Luis Potosi, Mexico Sept. 22, 1966 by W. S. McAlpine, Slide No. 506 Tamazunchale, San Luis Potosi, Mexico May 17, 1962 by Geo. W. Rawson, Slide No. 1410 Cd. de Valles, San Luis Potosi, Mexico Sept. 22, 1966 by W. S. McAlpine, Slide No. 846 Valles, Mexico, Dec. 30, 1941 by Stallings and Turner. ♂ Slide No. 1318 (wing venation) Misantla, Vera Cruz, Mexico.

No. 23 *C. acapulcoensis,* new spec., Slide No. 504, Acapulco, Guerrero, Mexico June 4, 1962 elev. 23 ft. by Geo. W. Rawson, Slide No. 505 Acapulco, Guerrero, Mexico June 12, 1962 by Geo. W. Rawson, Slide No. 960, Acapulco, Guerrero, Mexico Dec. 8, 1939 by F. H. Rindge, A.M. Slide No. 774 Acapulco, Guerrero, Mexico June 4, 1962 by Geo. W. Rawson, Slide No. 775 Acapulco, Guerrero, Mexico, June 4, 1962 Geo. W. Rawson. ♂ Slide No. 504 (wing venation) Acapulco, Guerrero, Mexico.

No. 24 *C. azteca,* new spec., Slide No. 319 Oriziba, Vera Cruz, Mexico on July 25, 1956 by R. R. Dreisbach, Slide No. 999 Fortin de los Flores, Vera Cruz, Mexico by Geo. W. Rawson, Slide No. 989 Fortin de los Flores, Vera Cruz, Mexico by Geo. W. Rawson, Slide No. 1004 Fortin de los Flores, Vera Cruz, Mexico April 28, 1965 by Geo. W. Rawson. ♂ Slide No. 998 (wing venation) Fortin de los Flores, Vera Cruz, Mexico.

No. 25 *C. yucatana,* new spec., Slide No. 619 X-Can Quintana Roo, Mexico, El. 200 m. July 19, 1962 by E. C. Welling, Slide No. 1331 X-Can Quintana Roo, Mexico, July 8, 1953 by E. C. Welling. ♂ Slide No. 1391 (wing venation) Sayolapan, El Bajo Oaxaca, Mexico.

No. 26 *C. maya,* new spec., Slide No. 657 Tepescuintle, Municipio Tenosique, Tabasco, Mexico, Oct. 21, 1962 El. 200 m. by E. C. Welling Slide No. 642 Chichen Itza, Yucatan, Mexico Dec. 8, 1962 by E. C. Welling, Slide No. 966 Chichen Itza, Yucatan Mexico, Slide No. 838 Chichen Itza, Yucatan, Mexico, Dec. 8, 1962 by E. C. Welling. ♂ Slide No. 640 (wing venation) X-Can Quintana Roo, Mexico.

No. 27 *C. wellingi,* new spec., Slide No. 951 Municipio Tenosique, Tabasco, Mexico El. 200 m. Sept. 12, 1962 by E. C. Welling, Slide No. 627 Tepescuintle Tabasco, Mexico, Oct. 1962 by E. C. Welling, Slide No. 841, Municipio Tenosique, Tabasco, Mexico, Oct. 18, 1962 by E. C. Welling. ♂ Slide No. 663 (wing venation) Tepescuintle Mu. Ten. Tabasco, Mexico.

No. 27A *C. wellingi, baleuensis,* new sub. spec., Slide No. 1980, Baleu, San Cristobal, verapaz Alta Verepaz, Guatemala, El. 4400 ft. Aug. 17, 1966 by E. C. Welling, Slide No. 1695, Baleu, Mpio San Cristobal, Verapaz, Alta Verapaz, Guatemala June 26, 1965 by E. C. Welling, Slide No. 1876 Baleu, Mpio, San Cristobal, Verapaz, Alta Verapaz, Guatemala, Aug. 13, 1966 by E. C. Welling.

No. 28 *C. sacapulas,* new spec., Slide No. 1193 Sacapulas, Guatemala Aug. 12, 1947 by P. Vaurie, A.M.

No. 29 *C. clenchi,* new spec., Slide No. 1816, Quisache, Mpio, Acatenango, Chimaltenango, Quatemala El. 1750 m. Aug. 1, 1965 by E. C. Welling, Slide No. 1830 Quisache, Mpio, Acatenango, Chimaltenango, Guatemala July 23, 1965 by E. C. Welling, Slide No. 1784 Quisache, Mpio, Acatenango, Chimaltenango, Guatemala, Aug. 5, 1965 by E. C. Welling, Slide No. 1798 Baleu, Mpio San Cristobal, Verapaz, Alta Verapaz, Guatemala Jan. 29, by E. C. Welling. ♂ Slide No. 1826 (wing venation) Quisache, Guatemala, Welling.

No. 30 *C. browni,* new spec., Slide No. 819 Turrialba Ais, Costa Rica, El. 620 m. May 30, 1945 by F. M. Brown for A.M., Slide No. 816 Turrialba, Ais, Costa Rica, May 29, 1946 by F. M. Brown, Slide No. 817 Hda. El Rodeo, Costa Rica, 900 m. June 11, 1946 by F. M. Brown for A.M. ♂ Slide No. 686 (wing venation) Turrialba Ais, Costa Rica.

No. 31 *C. schausi,* new spec., Slide No. 68 San Mateo, Costa Rica, Sept. Coll. W. Schaus U.S. National Museum, Slide No. 199 Tegucigalpa, Honduras, July 30, 1918, F. J. Dyer for Amer. Museum, Slide No. 1315 Avangariz, Costa Rica, July, Schaus and Barnes U.S. National Museum, Slide No. 818 Limon Farm, Rda El Rodeo, Costa Rica El. 700 m. Col by H. H. and F. M. Brown for American Museum, Slide No. 1178 San Mateo, Costa Rica, Oct. from Carnegie Museum. ♂ Slide No. 199 (wing venation) Tegucigalpa, Honduras.

No. 32 *C. guatemala,* new spec., Slide No. 154 Pacific Coast Guatemala F.D.G. and O.S. Valley of River Polochic, Hague, G. and S. Col. 1914-15 in B.M. Slide No. 259 S. Geronimo, Guatemala by Champion, Godman-Salvin Col. 1914-15 in B.M.

No. 32A *C. guatemala,* new spec., (variants), Slide No. 250 Guazacapan, Guatemala, Rothschild Bequest 1939-1 B.M. Slide No. 238 Polochic Valley, Guatemala, Godman and Salvin Col. 1914-15 B.M. Slide No. 239 Polochic Valley, Hague, Guatemala, G.D.G. and O.S. Co. B.M. Slide No. 156 Guazácapan, Gutemala, Rothschild Bequest 1939-1 in B.M.

No. 33 *C. inca,* new spec., Slide No. 1905, Cacagualito Dept. of Magdalena, Colombia, S.A. El. 1500 ft. May, Holland Col. C.M., Slide No .1904 Cacagualito, Dept. Magdalena, Colombia, S.A. El. 1500 ft. May Hoiland Col. C.M., Slide No. 1892 Cacagualito, Dept. Magdelena, Columbia, S.A. El. 1500 ft., May, Holland Col. C.M. ♂ Slide No 1893 (wing venation) Minca, Dept. Magdalena, Colombia, S.A.

No. 34 *C. tapuyo,* new spec., Slide No. 705 Orosi, Brazil, Aug. 1931 Col. of Albert Pinkus, in A.M., Slide No. 2002, Orosi, Brazil, Aug. 17, 1931, Col. of Albert Pinkus, in A.M.

No. 35 *C. aymaran,* new spec., Slide No. 1947 Rio Surutu, East Bolivia, S.A. El. 350 m. April 1915 Acc. 5570 C.M., Slide No. 1965 Rio Surutu, East Bolivia, S.A. El. 350 m. Holland Col. C.M., Slide No. 1951, Rio Surutu, East Bolivia, S.A. El. 350 m. J. Steinbach, Holland Col. C.M., Slide No. 131 Chanchamayo, Peru, Schuncke Col. Rothschild Bequest 1939, B.M., Slide No. 1948 Rio Surutu, East Bolivia, S.A. J. Steinbach, Holland Co. C.M. ♂ Slide No. 1994 (wing venation) Sapucay, Paraguay, S.A.

No. 35A *C. aymaran*, new spec., (variants), Slide No. 40, San Jacinthe Valley, Theophilo Ottoni, Minas Geraes, Brazil by F. Birch 1907-8 Rothschild Bequest, B.M. 1939-1, Slide No. 55 Tejuco, Brazil, Dec. Rothschild Bequest, B.M. 1939-1., Slide No. 20 Itaparica, Brazil, Dec. 16, 1905 Meade-Waldo 1906-162 B.M., Slide No. 131 Chanamayo, Peru, Schuncke Col. Rothschild Bequest, B.M. 1939-1.

No. 36 *C. brazilensis*, new spec., Slide No. 1990, Pernambuco, North Brazil, S.A. by W.A. Forbes in B.M., Slide No. 1991 Cabo, Pernambuco, Brazil, S.A., A. M. Moss, Rothschild Bequest, B.M., Slide No. 90 Rothschild Bequest 1939-1 B.M., Slide No. 13 Bahia, Brazil, Rothschild Bequest 1939-1 B.M., ♂ Slide No. 681 (wing venation) Tiuma, Pernambuco, Brazil, S.A.

No. 37 *C. burgeri*, new spec., Slide No. 198 Purnio, Colombia El. 280 m. EX-E XI. 96 Dr. Burger,, in B.M. End of Rainy Season.

No. 38 *Charis iris*, Slide No. 1380 Juan Vinas 2500 to 3500 ft. Costa Rica, Oct. 1906, U.S.N.M., Slide No. 1379 Peralta, Costa Rica, Feb. 1907, Wm. Schaus, U.S.N.M. ♂ Slide No. 1380 (wing venation) Juan Vinas, Costa Rica, El. 2500 ft., Oct. 1905, U.S. Nat. Mus.

No. 39 *Charis velutina*, Slide No. 2062 Chejel, Guatemala, Edwin T. Owen Coll., U.S.N.M., Slide No. 1381 Oriziba, Mexico, Jan. 1909, R. Muller, U.S.N.M. ♂ Slide No. 2062 (wing venation) Chejel, Guatemala (Edwin Owen Coll.), U.S. Nat. Mus.

CALEPHELIS WING VENATION

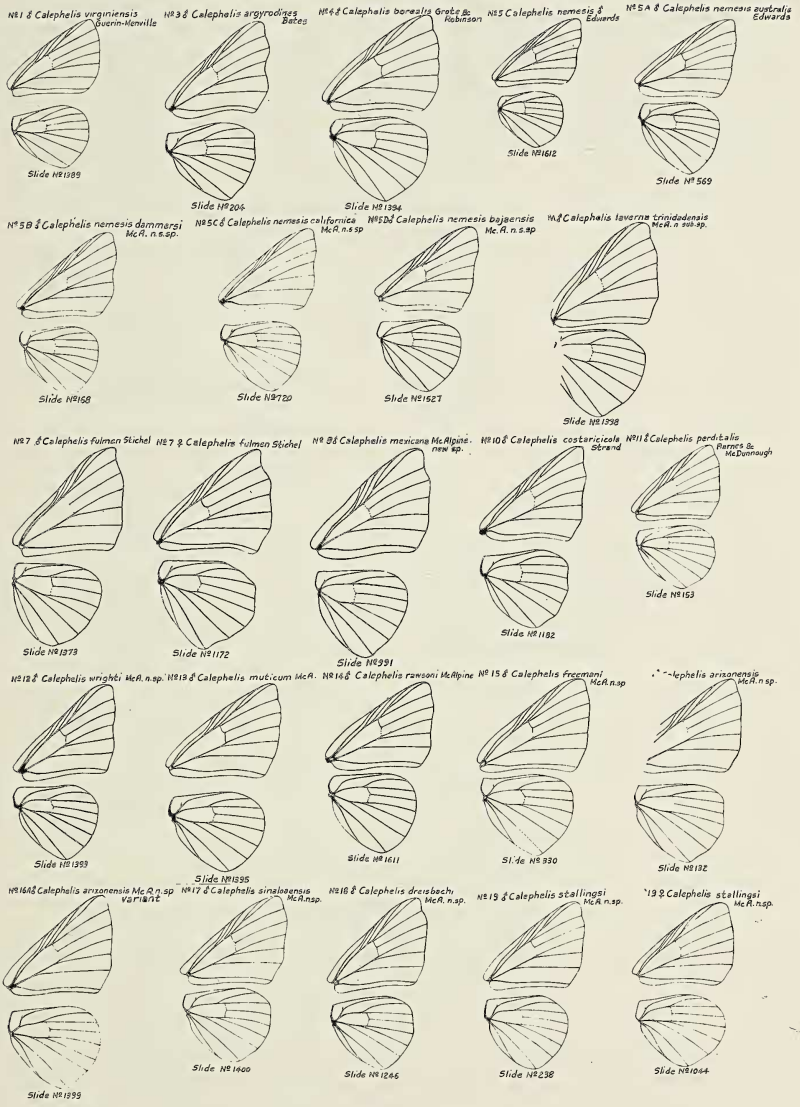


Figure 14

CALEPHELIS WING VENATION

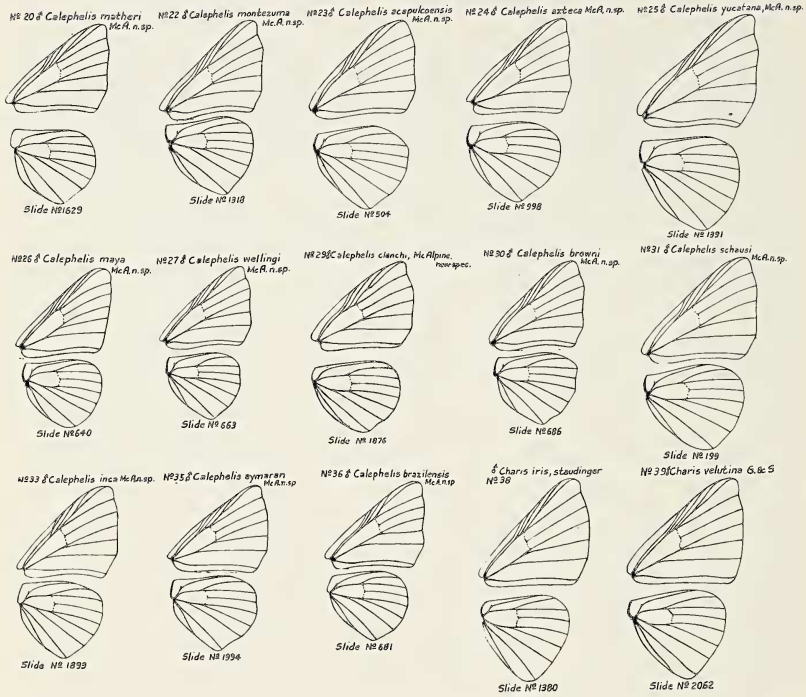


Figure 15

CALEPHELIS GENITALIA

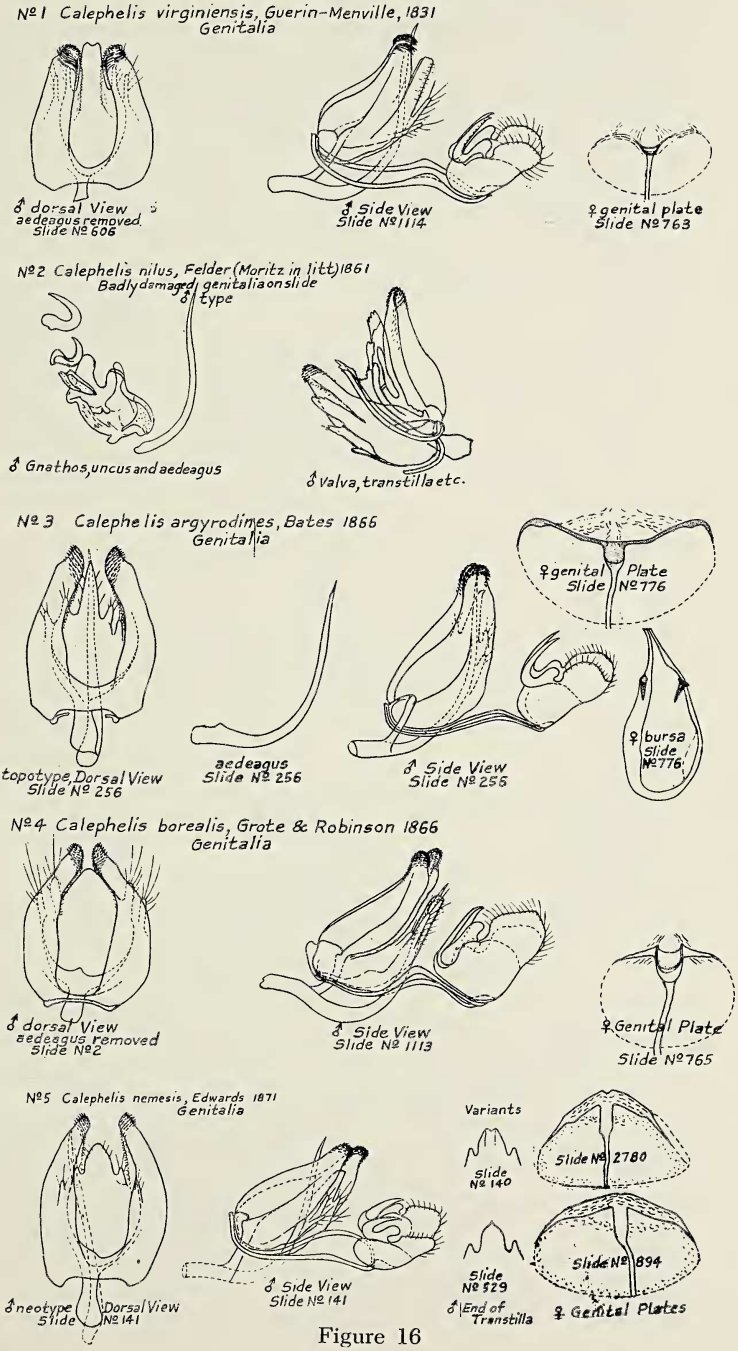


Figure 16

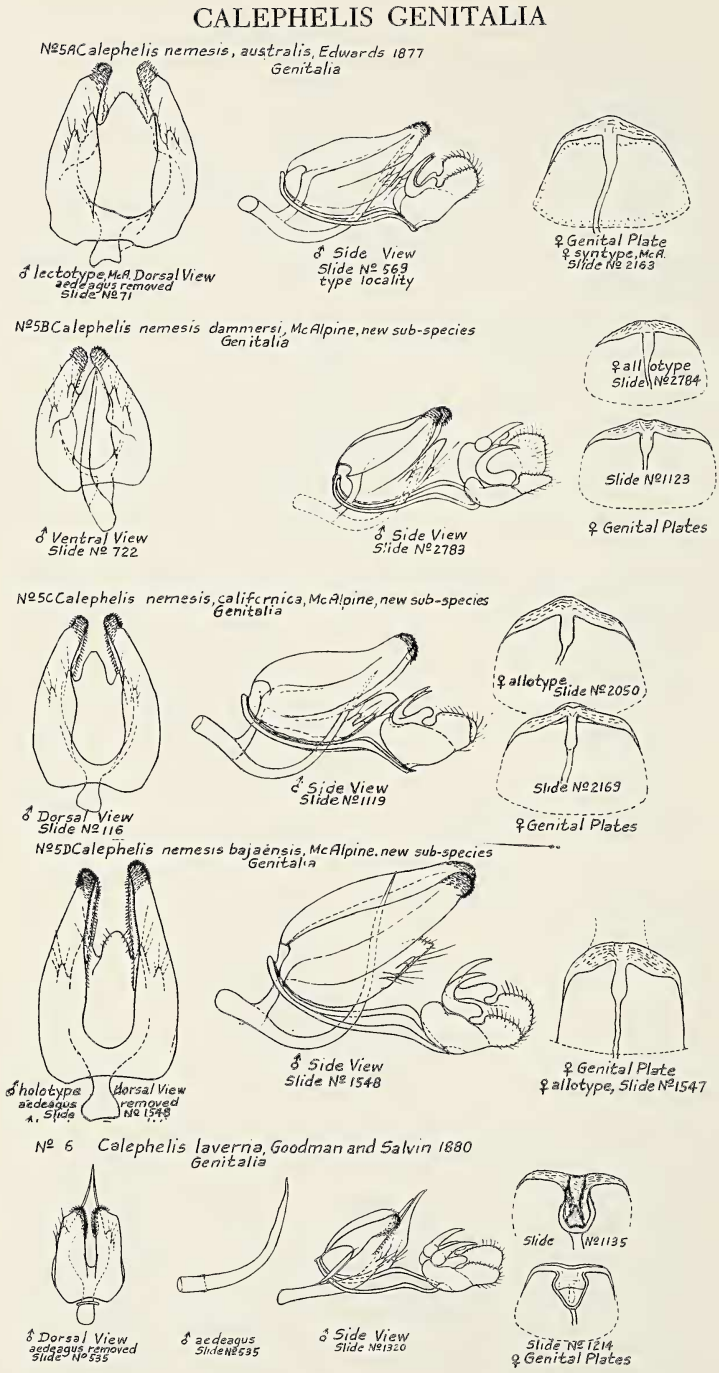

CALEPHELIS GENITALIA
№5A Calephelis nemesis, australis, Edwards 1877
Genitalia
♂ lectotype, McA. Dorsal View
aedeagus removed
Slide № 71
♂ Side View
Slide № 569
type locality
♀ Genital Plate
♀ syntype, McA.
Slide № 2163
№5B Calephelis nemesis dammersi, McAlpine, new sub-species
Genitalia
♂ Ventral View
Slide № 722
♂ Side View
Slide № 2783
♀ allotype
Slide № 2784
Slide № 1123
♀ Genital Plates
№5C Calephelis nemesis, californica, McAlpine, new sub-species
Genitalia
♂ Dorsal View
Slide № 116
♂ Side View
Slide № 1119
♀ allotype
Slide № 2050
Slide № 2169
♀ Genital Plates
№5D Calephelis nemesis bajaensis, McAlpine, new sub-species
Genitalia
♂ holotype
aedeagus
Slide
Dorsal View
removed
№ 1548
♂ Side View
Slide № 1548
♀ Genital Plate
♀ allotype, Slide № 1547
№ 6 Calephelis laverna, Goodman and Salvin 1880
Genitalia
♂ Dorsal View
aedeagus removed
Slide № 535
♂ aedeagus
Slide № 535
♂ Side View
Slide № 1320
Slide
№ 1135
Slide № 1214
♀ Genital Plates

Figure 17

CALEPHELIS GENITALIA

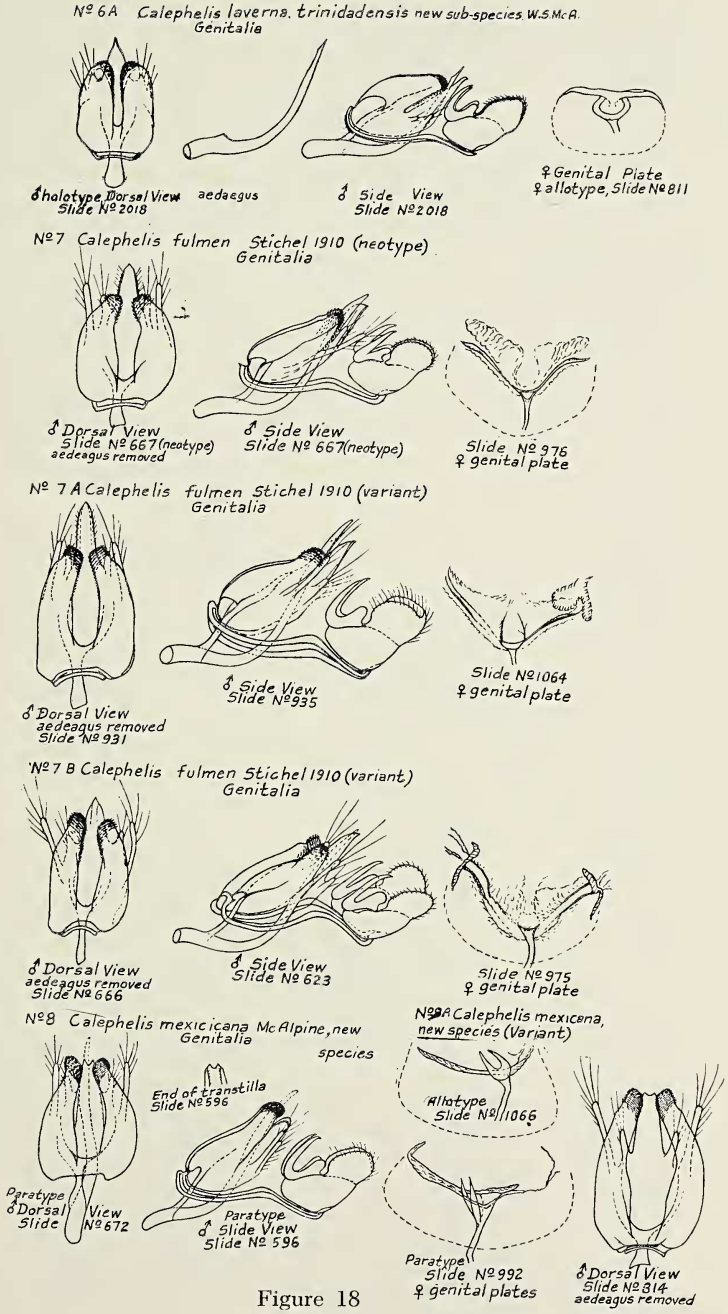


Figure 18

CALEPHELIS GENITALIA

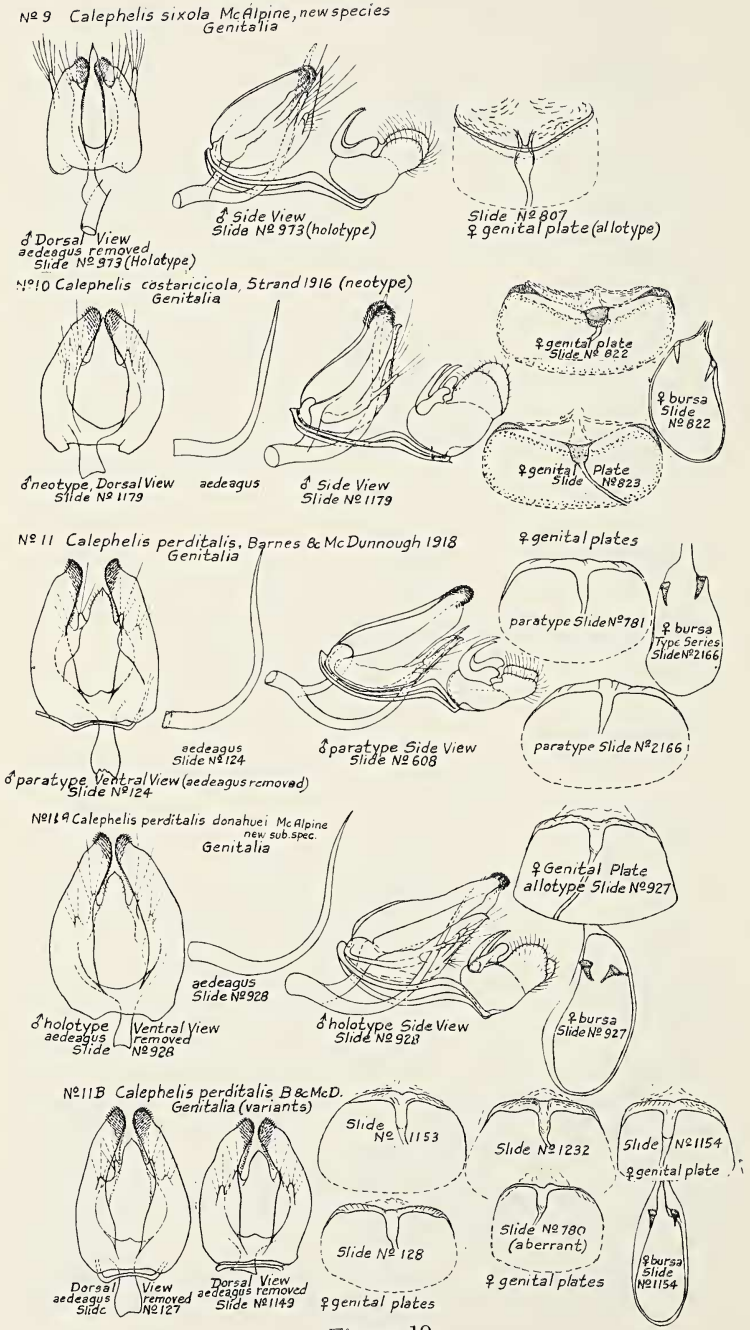


Figure 19

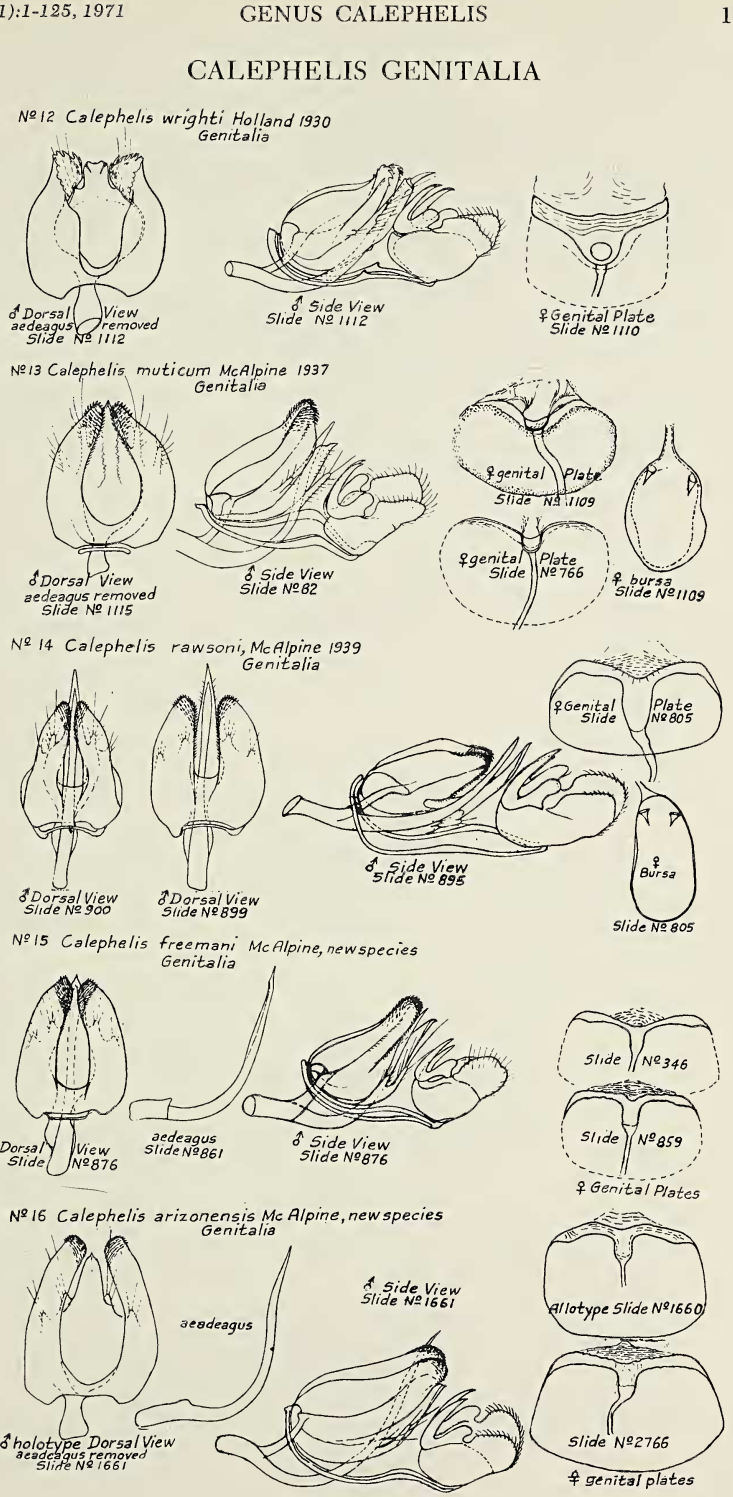

CALEPHELIS GENITALIA
№12 Calephelis wrighti Holland 1930
Genitalia
♂ Dorsal View aedeagus removed Slide № 1112
♂ Side View Slide № 1112
♀ Genital Plate Slide № 1110
№13 Calephelis muticum McAlpine 1937
Genitalia
♂ Dorsal View aedeagus removed Slide № 1115
♂ Side View Slide № 82
♀ genital Plate Slide № 1109
♀ genital Plate Slide № 766
♀ bursa Slide № 1109
№ 14 Calephelis rawsoni, McAlpine 1939
Genitalia
♂ Dorsal View Slide № 900
♂ Dorsal View Slide № 899
♂ Side View Slide № 895
♀ Genital Plate Slide № 805
♀ Bursa Slide № 805
№15 Calephelis freemani McAlpine, new species
Genitalia
♂ Dorsal View Slide № 876
aedeagus Slide № 861
♂ Side View Slide № 876
Slide № 346
Slide № 859
♀ Genital Plates
№16 Calephelis arizonensis McAlpine, new species
Genitalia
aedeagus
♂ Side View Slide № 1661
♂ holotype Dorsal View aedeagus removed Slide № 1661
Allotype Slide № 1660
Slide № 2766
♀ genital plates

Figure 20

CALEPHELIS GENITALIA

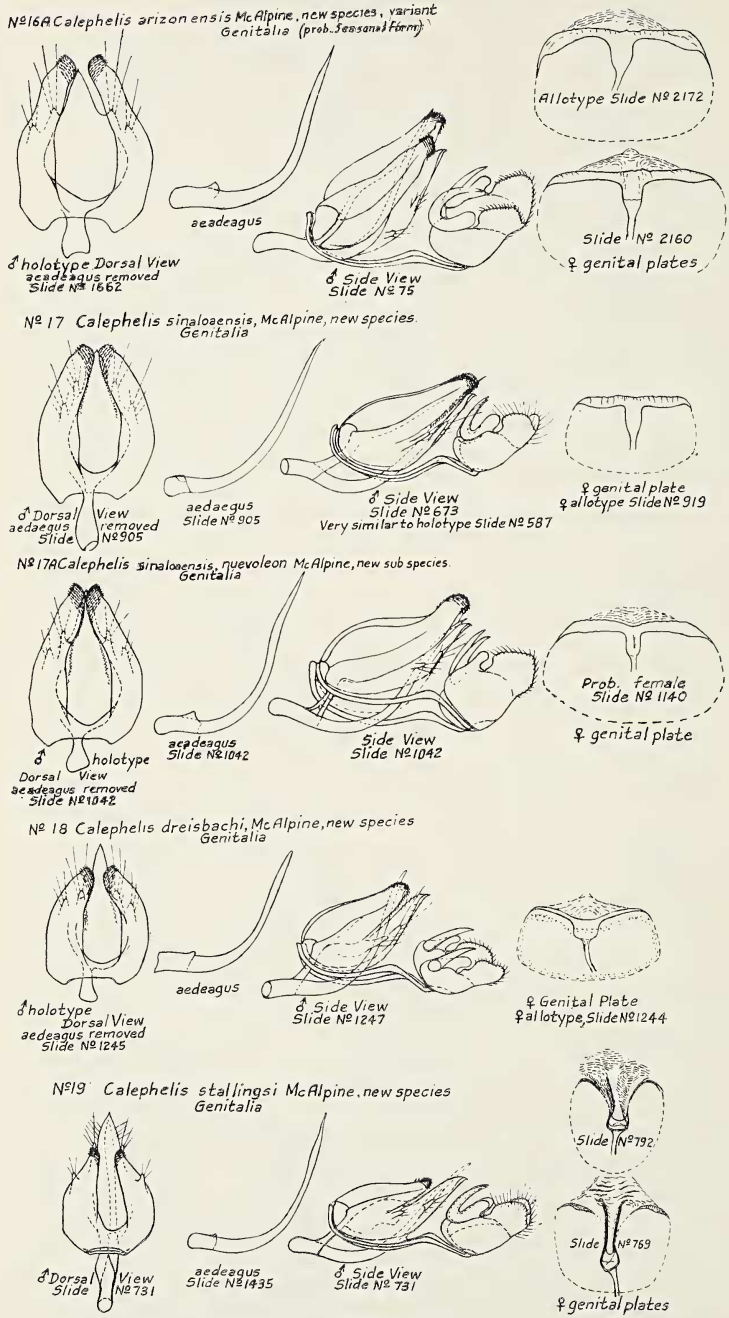


Figure 21

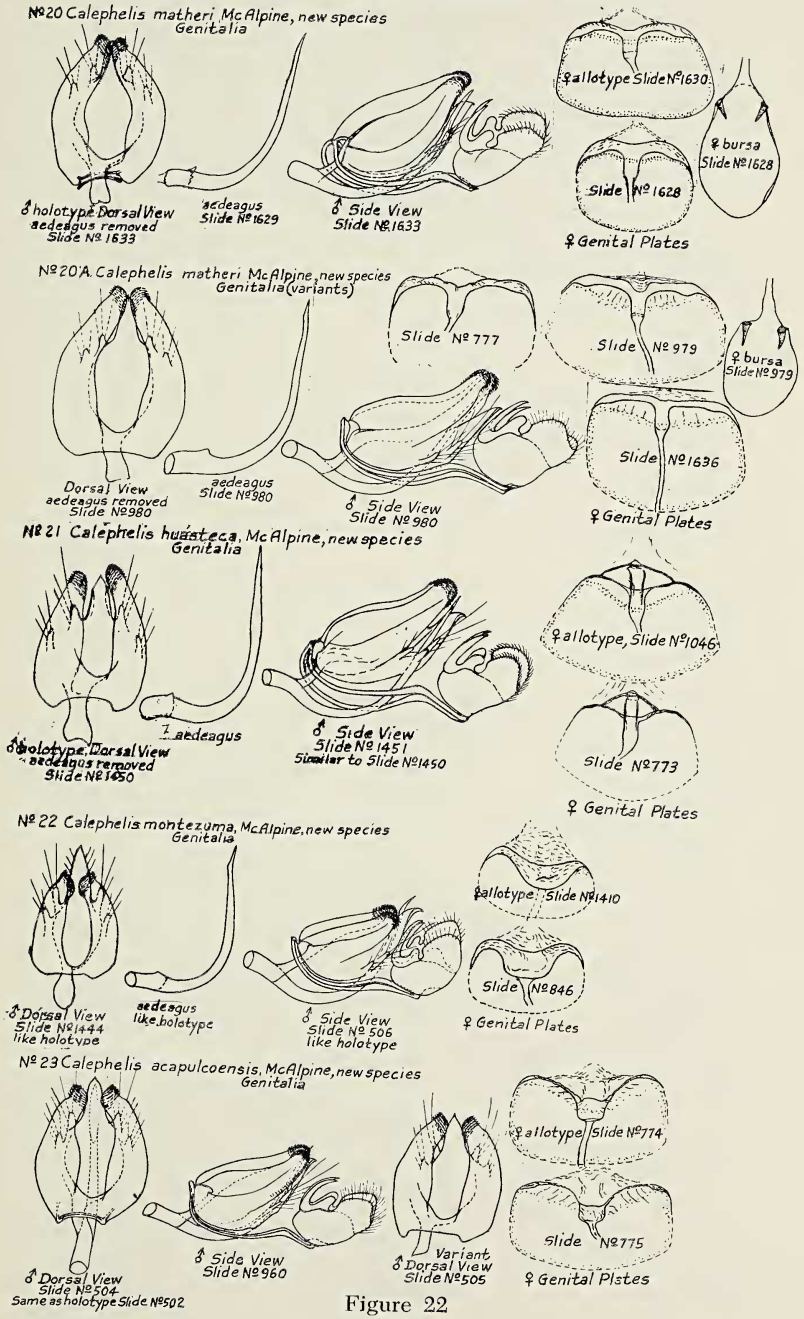

CALEPHELIS GENITALIA
№20 Calephelis matheri McAlpine, new species
Genitalia
♂ holotype Dorsal View
aedeagus removed
Slide № 1633
aedeagus
Slide № 1629
♂ Side View
Slide № 1633
♀ allotype Slide № 1630
♀ bursa
Slide № 1628
Slide № 1628
♀ Genital Plates
№20A Calephelis matheri McAlpine, new species
Genitalia (variants)
Dorsal View
aedeagus removed
Slide № 980
aedeagus
Slide № 980
♂ Side View
Slide № 980
Slide № 777
Slide № 979
♀ bursa
Slide № 979
Slide № 1636
♀ Genital Plates
№21 Calephelis huasteca, McAlpine, new species
Genitalia
♂ holotype, Dorsal View
aedeagus removed
Slide № 1450
aedeagus
♂ Side View
Slide № 1451
Smaller to Slide № 1450
♀ allotype, Slide № 1046
Slide № 2773
♀ Genital Plates
№22 Calephelis montezuma, McAlpine, new species
Genitalia
♂ Dorsal View
Slide № 1444
like holotype
aedeagus
like holotype
♂ Side View
Slide № 506
like holotype
♀ allotype Slide № 1410
Slide № 846
♀ Genital Plates
№23 Calephelis acapulcoensis, McAlpine, new species
Genitalia
♂ Dorsal View
Slide № 504
Same as holotype Slide № 502
♂ Side View
Slide № 960
Variant
♂ Dorsal View
Slide № 505
♀ allotype Slide № 774
Slide № 2775
♀ Genital Plates

Figure 22

CALEPHELIS GENITALIA

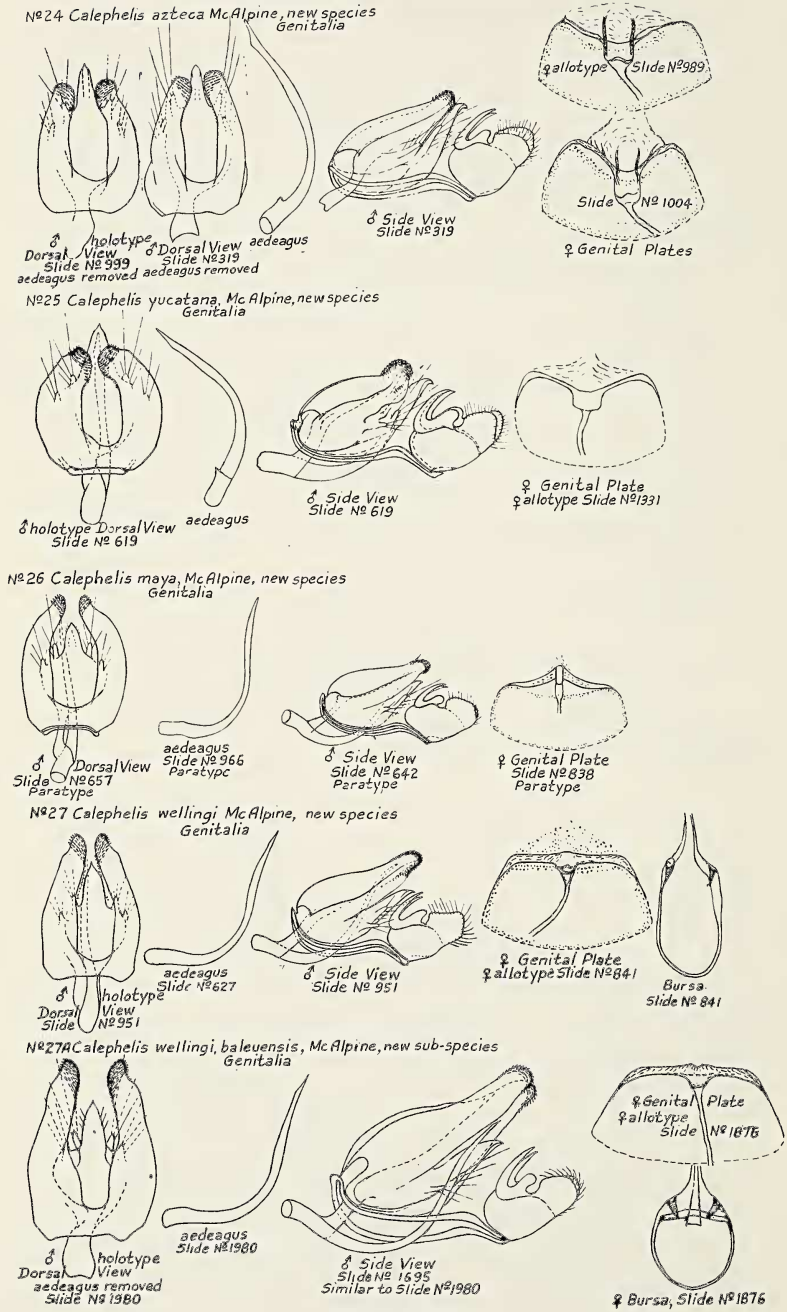


Figure 23

CALEPHELIS GENITALIA

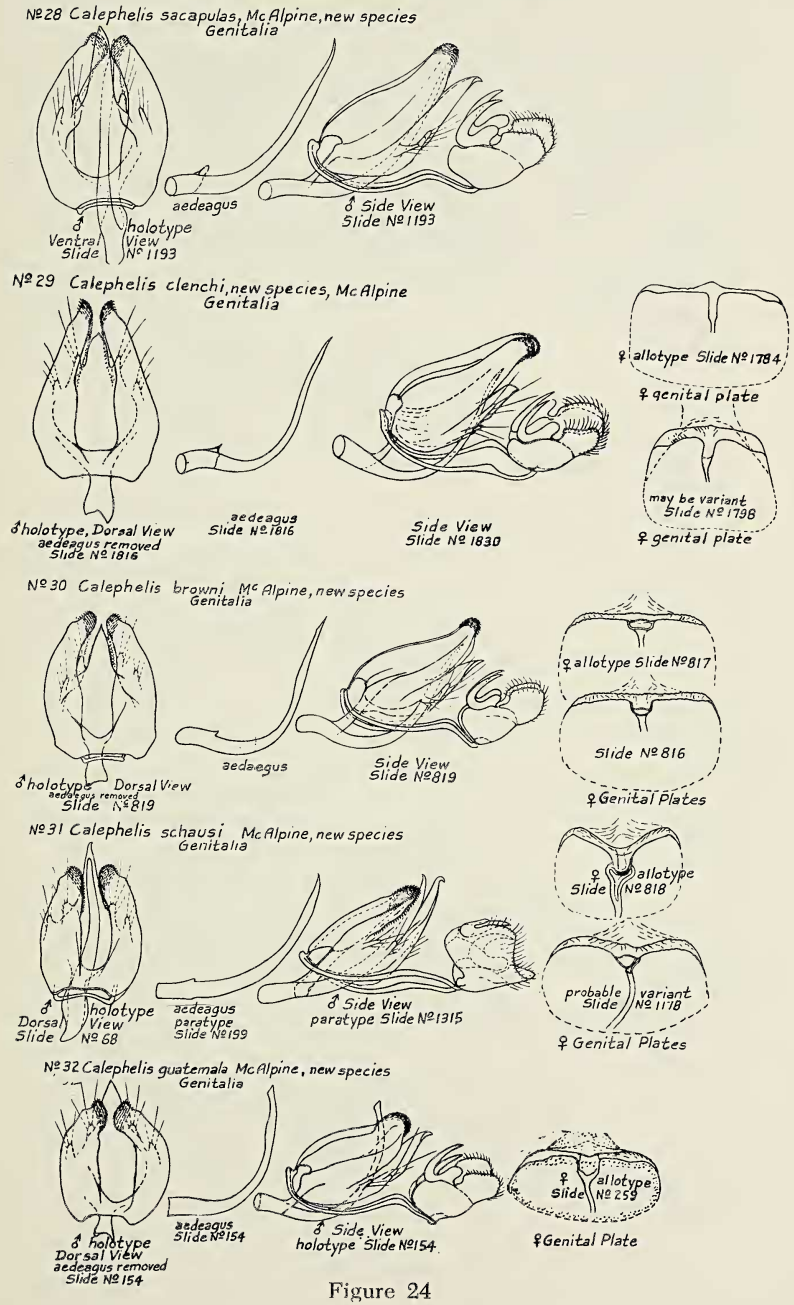


Figure 24

CALEPHELIS GENITALIA

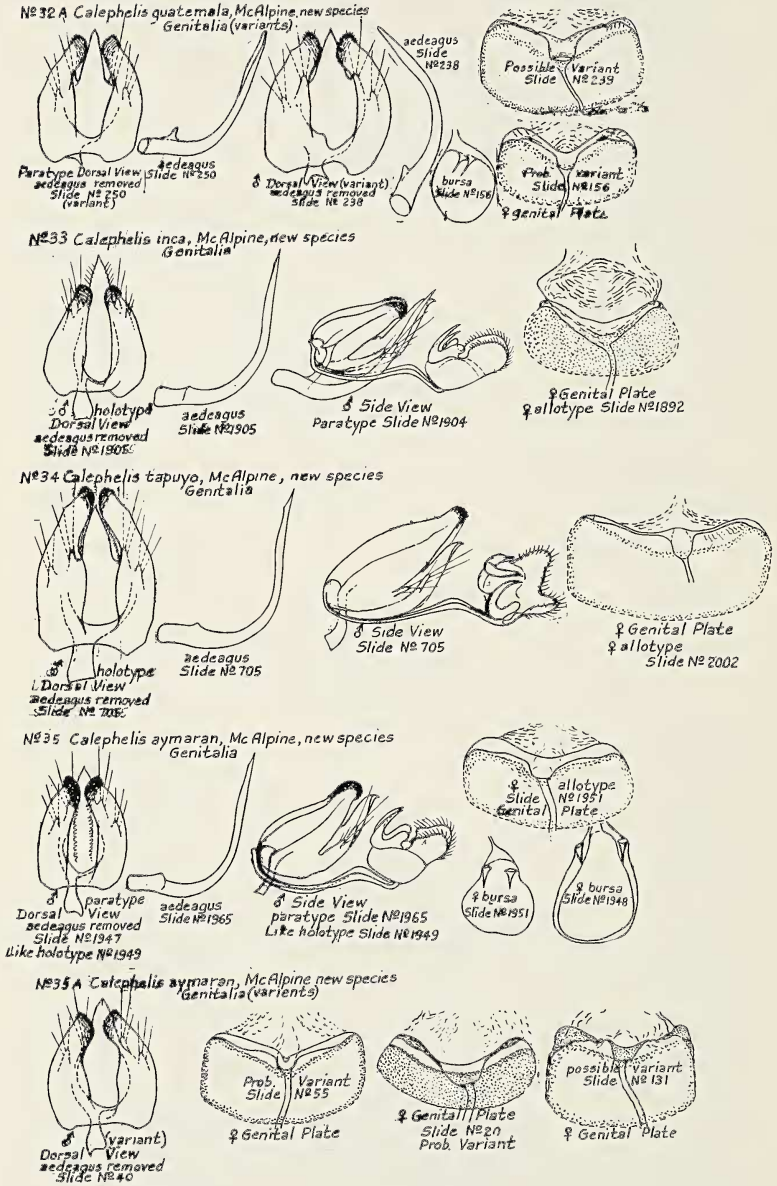


Figure 25

CALEPHELIS GENITALIA

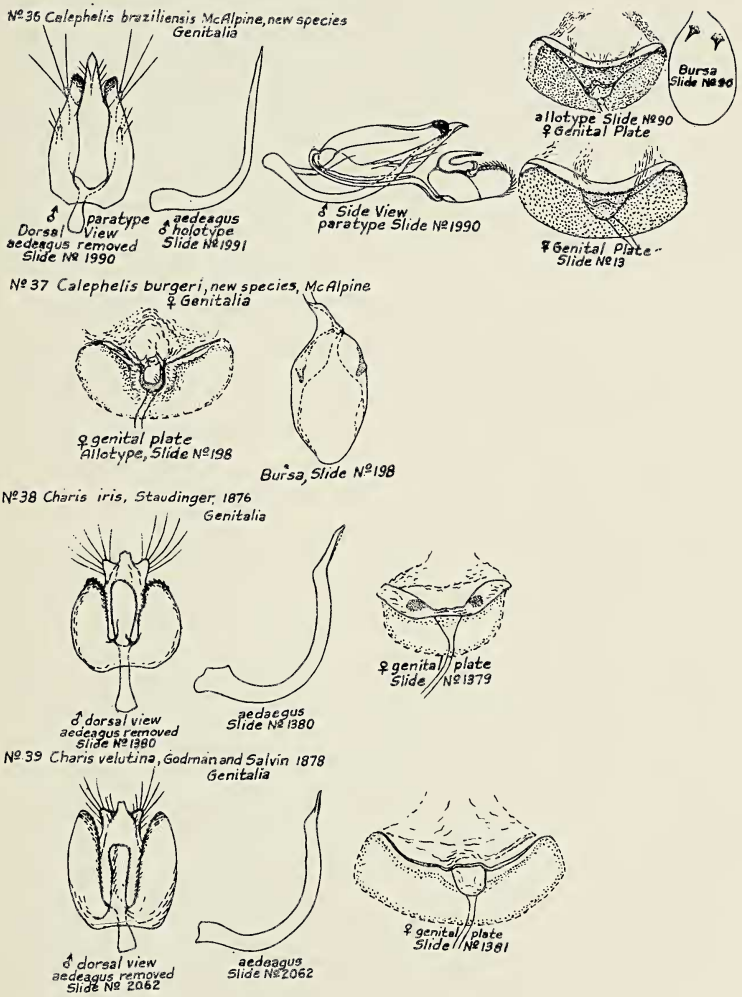


Figure 26